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CURATOR

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II/4 1959

Thoughts on the Organization of Museums

ROBERT BRUCE INVERARITY, DIRECTOR
THE ADIRONDACK MUSEUM

There is no doubt that never before in history have so many people become so involved with museums in their keenness to understand the now as well as the then. Whatever the reason, may it be the subconscious insecurity of the present, greater leisure, desire for knowledge, better publicity, or more exciting museums, this healthy blossoming growth is found not only in America but throughout the world.

Today's museums permeate the whole life-stream of our culture. The public, keenly aware of museum resources, have developed a close relationship to this mine of authoritative knowledge. Regardless of the field in which a museum may operate, the attendance is greater, and the staff is constantly answering more requests for information from the public, than ever before.

The development of a museum is somewhat like the growth of a painting. The first stroke of the brush by its form, value, and color has a bearing on the last stroke of the finished painting.

In the founding of a museum, the decisions made in the beginning can make future operations successful or so strangle the program that the museum is merely a shadow of its potential self. The founding and building of a new museum is, to me, a very creative act. Not that the director who takes over an existing museum is not creative in the way he changes or develops his institution, but he does have an organization established by his predecessors, the staff is actively engaged in making the institution operate, collections have been formed, he has public participation, and a program is in operation.

It has been my good fortune to have planned and organized a number of galleries and several museums. In each instance there have been basic problems that are common to all museums, capped by the endless variety of the individual type of museum.

There is no *one* way to build a museum, run it, or exhibit the material in the collections. Museums are as varied as their subject matter and as successful as their trustees and staff. In the beginning—as well as from that time on—a good board of trustees is the most important factor involved. It is somewhat like choosing one's parents—they should be healthy, wealthy, and wise. I have had the doubtful pleasure of having a board of directors composed of people who appeared to be concerned only with the prestige value of being on a museum board. Their former experience with museums usually consisted of occasionally visiting, or having a membership in, some museum. People of this type either take no interest in the museum or take too much. In the latter case, believing they know all the answers, they cannot wait to arrange your life for you. Boards composed of trustees of this type might be called adolescent boards. They love intrigue, have little business sense, and in no way operate as a board should.

A museum board should be concerned with basic policy, the raising and spending of funds, and be aware of the museum's work in order to judge its value to the community and justify the financial expenditure for this result. The chairman of the board is the contact between the board and director and staff. A good board and chairman can make a director's job a joy; a poor chairman and board can make the director's life a hell and the museum a failure, regardless of the money available to the museum. I have experienced both types and am now fortunately blessed with a model chairman and board.

After a board of trustees has been formed and a director appointed, an architect should be "discovered." In the past I have worked with architects who have made a great contribution and also with those whose main dedication seemed to be to confuse all issues. Actually persons connected with the museum should not expect the architect to plan the museum. Perhaps in a particular case this might happen but, in general, the museum should be designed with the architect by museum people who know the problems and needs of a museum. It has been my experience that a museum building should be planned from the inside out and that form should follow function. The architect, if he is the right one, will take the plans, and the needs, and skillfully weld these with taste into a working whole.

One of the most important factors in designing a museum building is to provide for flexibility—flexibility for the use of all space and the expansion that will come in the future. It is a sorry museum that finds its building so constructed that it is impossible to add to the structure without tearing it to pieces. What appears to be adequate office space today in ten years may provide only a fraction of the offices needed for an expanded program. Galleries, separated by bearing walls, in time may

need to be converted to other uses because the bearing walls preclude removing these walls to make larger galleries.

The location and type of museum will automatically dictate certain needs. The art museum in the center of a city will have one type of future expansion which will be different from the natural history museum located in a large park in a smaller city. For instance, in one case land is expensive and not readily available; in the second case land is available and the museum may wish to develop in spreading units.

Along with the growth of leisure time and use of the automobile, there have developed, in America, many museums with a different character than the usual art or science museum of the city. The subject matter may vary, but there is one consistent point in that the museum is located out, or on the outskirts, of a city, or even at a point miles away from a city. These might well be called roadside museums. Such museums may be devoted to ships, farming, folk culture, military events, and the like. At first glance they may all seem quite different, but a second look will begin to point up similarities. One of the outstanding differences between this type of museum and the metropolitan type is that in the city the museum must constantly have an active changing program, as its audience is basically one from its city. The museum located away from the city has a constantly changing audience from a great variety of places, and there will be fewer activities but greater emphasis on exhibitions. This difference alone to a great extent determines museum layout, presentation, staff, and program.

Let me use the museum of which I am now director as an example. The Adirondack Museum is in New York State, located near the junction of Highways 28 and 10 in the heart of the Adirondack Mountains at Blue Mountain Lake. There is a tiny village about three-quarters of a mile from the Museum. The museum site commands one of the finest views in the area, overlooking Blue Mountain Lake, Eagle Lake, Utowana Lake, and the surrounding mountains. We have over twenty-five acres of uneven terrain, and on this are ten buildings devoted to museum display. Originally, this was the site of one of the early Adirondack hotels and still standing is one of the log cabins once used as a hotel. Later other hotel buildings were constructed until there was a complex of a large main building surrounded by small structures. In 1948 a group of local residents started the Adirondack Historical Association, which practically expired as a result of the Korean War. In 1954 a group of New Yorkers who maintain summer homes in the area revived the Association and decided a museum devoted to the Adirondacks was needed. Shortly thereafter a state charter was obtained, an architect and a director were employed, and the gestation period of the museum began.

For a moment consider the problems at this point. We now have a site

located in the heart of the Adirondack Mountains miles away from any city, thirty-six miles from a railroad station, and in a country where the winters are long and cold. These factors required that the museum would be open only in the summer, the visitors would of necessity come by automobile, provisions must be made for warm and cold weather and shelter from sudden rain, and it must be interesting enough to draw visitors from a distance.

It was decided to tear down the main building of the old hotel, as well as some of the smaller buildings, and erect a large central structure as a focal point in a campus-like arrangement.

At this point further thought was given to developing the approach the museum would take and how it would be accomplished.

The Adirondacks, owing to their terrain, have developed later than the surrounding area. This growth was started by the lumbermen and furthered by the hunters and fishermen. Then in turn came small hotels, summer camps, and tourism. As a theme for the museum it was decided that man and his relationship to the Adirondacks would become the special area of our concern. This may be called history, ethnology, or ecology, depending on one's point of view.

Three general approaches were worked out to interpret the area. As lumbering had played such a large part in the development of the area, and also as many of the lumbering techniques were unusual and no longer practiced, a series of dioramas were designed to illustrate phases of lumbering. Collecting was started in an attempt to secure the actual objects that would be illustrated in the dioramas, so the visitor could survey a series showing how objects were used and then see the actual objects themselves. Hence it is now possible to see in miniature a full load of logs on winter runners, a sprinkler wagon for icing the winter lumbering roads, the small tools and boats as they were used by the lumbermen, as well as the full-scale objects. The great variety of memorabilia of the area would be collected and exhibited, historical events of importance, as well as ways of life peculiar to the Adirondacks, would be illustrated in dioramas, and if possible actual related objects would be brought together for display. Along with all this we decided to collect every form of visual material that would help explain the area and its growth—paintings, photographs, illustrations, prints, maps, and so forth.

Fig. 1. Aerial view of the Adirondack Museum, showing the museum buildings in the foreground and Blue Mountain and Eagle and Utowana rivers in the background.

Fig. 2. Main building of the Adirondack Museum.

Fig. 1

Fig. 2

The complex of hunting, fishing, transportation, guides, hotels, camps, and the like would also be explained.

Now that a planned program was developed, two things could start: the collecting of material, and the design and construction of the main building and other necessary buildings. In two years this program was accomplished to such a degree that it was possible to open the museum to the public in August, 1957. Together with the above activities, a research library was started, and at the present writing contains a sizable amount of literature related to, or concerning, the Adirondacks. Many problems arose, and I shall merely recount a few to give the flavor of the director's problems. With ten buildings and material spread out over a good part of the twenty-five acres, how was this material to be protected? I have faith in the public to the extent that the ordinary individual will "in Rome do as the Romans do." He will put his name down where he sees other names written; he will throw paper where other people throw paper; if others let their children run and shout and climb, he will do likewise. These problems can be controlled to an extent by certain psychological devices. If an object is behind a railing just beyond reach, the visitor will usually make no attempt to touch it. If the rest-room walls are hard to write on, by using vitreous tile for wall surfaces, the first name does not appear. If it does, with lipstick, for instance, a regular patrol of these areas sees that the first name is removed as quickly as possible, and the second does not appear. If paved walks through lawns are constructed and the traffic flow is worked out, without creating a maze, the visitor will follow these paths and likewise make his children follow them. A wandering attendant to slow down the unusually rampant youngster keeps the pattern. If waste receptacles are placed throughout the public area, chances are that they will be used, but the patrolling attendant, along with answering questions and stopping running children, also immediately picks up stray bits of paper when they appear. In an area where summer help is expensive and hard to get, how could one staff such a museum? Hire college students—fine, but then where are they going to live, with summer space at a premium? This was solved by our hiring people who lived nearby and letting them each handle a certain area or exhibit. This has worked out extremely well. These guides first of all know a great deal about the Adirondacks, and an indoctrination program is limited to explaining how they should act, not the replies to questions for which they

Fig. 3. Visitors listening to talking labels in the Diorama Gallery.

Fig. 4. Diorama of logging in the Adirondack area, showing the skidding of logs and skidway.

Fig. 3

Fig. 4

already have the answers. It has developed that the people who worked the first year liked it so well they have wanted to come back each summer. This has produced a family type of relationship, with each individual having great pride in his work.

Explanations for exhibits can be a great problem. In one type of museum simple labels may do, but I have found three types of labels are usually needed: a general label in large, readable type to define the area and the material in it, a smaller label to give a short description of the group of objects, and then a longer label with as much pertinent information as possible. We meet this situation a bit differently from many museums, in that our large label for the man on the run is a four-page brochure given to each person as he enters the museum. This brochure contains a map of the grounds, showing the routing we would like the visitor to follow, although this is not mandatory and often people do the tour in reverse, and at each point of change a number on the map designates a paragraph of type which briefly indicates what is exhibited at this point. Most areas have large general labels, and several have every object labeled.

Where our dioramas are displayed we wished to make available a greater amount of information regarding each diorama. If this was put on a label, the visitor would not read through all the type, so it was necessary to work out a new device. For some time certain museums have rented to their visitors a small radio and earphone which will receive a tape-recorded lecture regarding the material in the gallery in which the visitor is standing. This device is fine, but my criticism of it is that one may walk into the gallery in the middle of the lecture, and if there is sequential information being given, the visitor is at a loss to understand the discourse until the tape repeats. Therefore, I went to a manufacturer of tape recorders and had them make, to my design and specifications, a device that has been eminently successful.

In our diorama gallery the visitor may obtain an earphone and approach any diorama, and by plugging the earphone into one of several outlets at the base of the diorama he will hear a specially recorded description of the diorama. Several people may plug into the same block of outlets at the base of the diorama and listen at one time. The same device is being used by us for regular display cases and even to give the visitor a his-

Fig. 5. Steamboat "Osprey" and other boats in artificial lake. Vehicle buildings in the background.

Fig. 6. Visitors enjoying a former Brooklyn City horsecar which was used in the Adirondacks to transport thousands of people over the Marion River Carry.

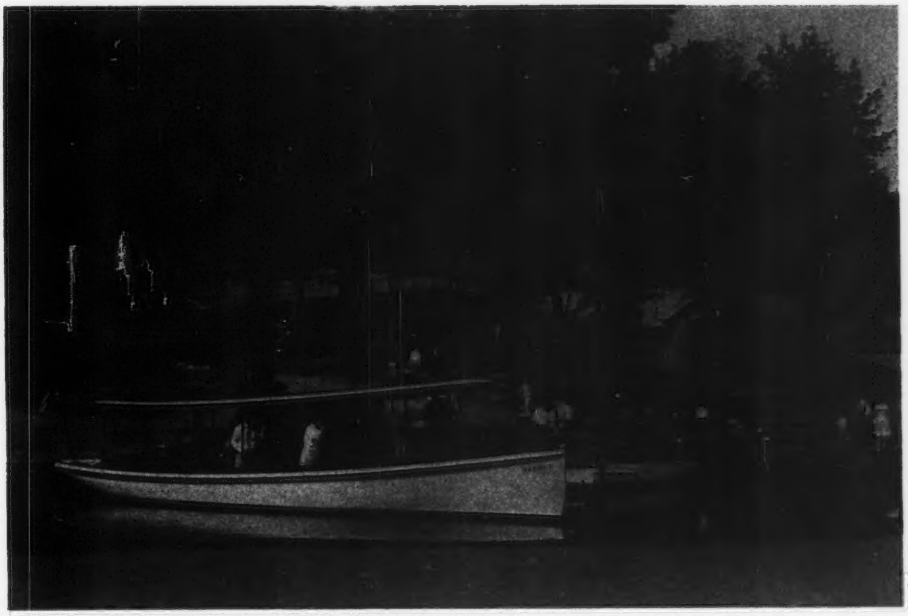

Fig. 5

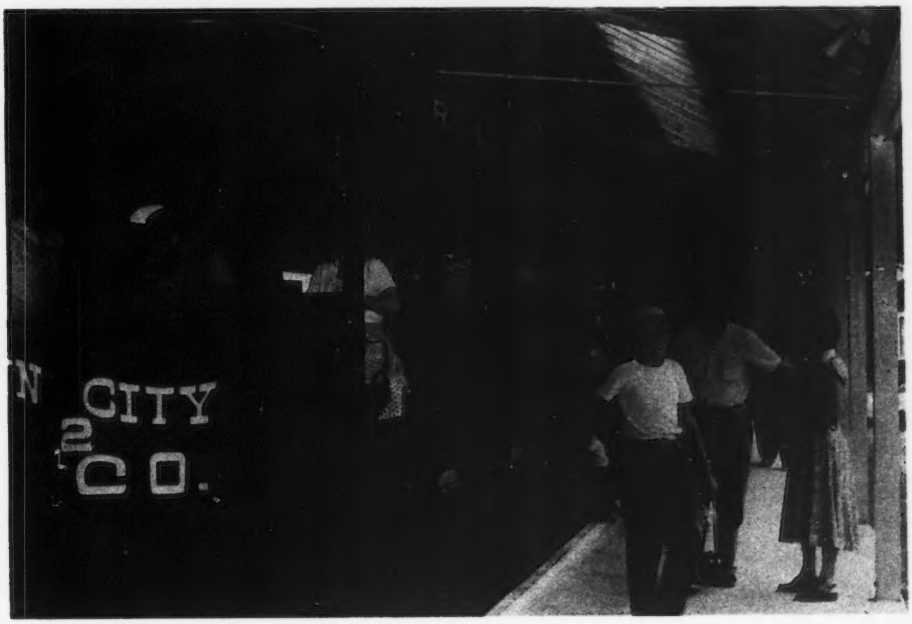

Fig. 6

torical background of the countryside as he gazes out a picture window. The advantage of this device is that the user immediately hears a talking label about the very display he is looking at. Few would ever read the same amount of copy that they now have ear-fed to them. The public is most enthusiastic about this means of using their eyes and ears at the same time, and small children are charmed into silence and absorption.

In our concern to display the means of transportation in the Adirondacks, we have not only collected enough vehicles to fill two separate buildings, but we have a large collection of boats. Small boats, such as those under twenty feet, can be displayed on racks, and we have found this works well for this type of boat. We also have collected one steamboat and two motor launches. These might have been placed on stocks, or buried to the waterline in sand. However, it appeared to us that the best way to show them would be in their own environment. Accordingly, we excavated and built a small lake, one hundred and forty-four feet long and eighty feet wide, in which the boats are floated.

It is my belief that if you allow your visitor to participate in some things he will respect you when you do not want his participation. To illustrate, we allow visitors to board the steamboat but not the other two boats. Although the pond we have made is small, I have watched youngsters sail that steamboat to the four corners of the earth. We also have the locomotive and a car from one of the shortest standard-gauge railroads in the world. The railroad ran less than three-quarters of a mile across a neck of land separating two Adirondack Lakes. Here again we invite people to clamber into the locomotive cabin and ride the non-moving converted Brooklyn City horsecar. As small grubby hands yank the muffled bell cord and lean out the driver's window, I have seen phantoms of Casey Jones or a race between the train and Indians. Lest you think this activity is only for little children, you had better reëvaluate your estimate of children's sizes.

I have not touched on the problems we meet in other parts of a museum operation such as public relations, publicity, collecting material, exhibitions, preparation, accessioning and cataloguing, and research. All these and more must go on in every museum, and someone must get the work done. The need in the smaller museum is for workers who have flexibility in that they can turn from one activity to another—"jack of all trades." The larger museum needs specialists who can pursue one field and, as the staff is larger, can leave everything but their main interest to others. Regardless of whether they be specialists or "jacks of all trades," I feel the most important requisite for general museum personnel is well-adjusted people with common sense. I am surprised how rare these commodities are and how great is their worth to a museum. These values are more important to me than the individual who may be a com-

petent specialist but cannot get along with the rest of the staff, is unable to pitch in and help out when needed in another department, cannot write a letter, takes the attitude "the public be damned," and is unable to solve any of his own problems without a conference with the head of his department or the director.

Every museum needs more helping hands, and we are not alone. We have a permanent staff composed of a custodian, a secretary, and a director. This staff is augmented with guides when the museum is in operation from June 15 to October 15. As much as possible we attempt to have the visitor be his own guide, and in turn we attempt to intrigue him by various means to view and enjoy our exhibits. We are an educational institution and have a responsibility to our visitors, the people of the Adirondacks, and the future.

The Use of Acids in the Preparation of Vertebrate Fossils

H. A. TOOMBS AND A. E. RIXON
DEPARTMENT OF PALEONTOLOGY
BRITISH MUSEUM (NATURAL HISTORY)

Thirteen years have passed since the first work appeared describing vertebrate fossils prepared from their rock matrix with acetic acid (White, 1946) and eleven years since one of us (Toombs, 1948) published in greater detail the uses to which this new tool can be put by the vertebrate palaeontologist. The method can no longer be considered a "nine-day-wonder" and is being increasingly used by specialists in many vertebrate groups, e.g., Kermack (1956). The present paper is largely a synopsis of work already published, but also contains several new developments.

We started to experiment with chemical methods some years before the 1939–1945 war, while preparing the fine ornamentation of ostracoderms from the Old Red Sandstone. Mechanical methods had proved quite inadequate. Eventually we found that acetic acid did not attack the calcium phosphate of which fossil bone is composed, though it dissolved the calcium carbonate of calcareous rocks. Since then, in twenty years' work on vertebrate fossils of all groups and all ages from Ordovician to Holocene, we have seen no evidence of chemical damage to bone from acetic acid. However, the use of acids raises its own problems, and from the first day that a preparator starts to use them in his work it is important that he regard them as tools which, like any other tools, he must learn to control. Merely to dump a specimen in a bath of acid and then walk away is to court disaster.

Although acetic acid can be used only on rock containing calcium carbonate, the rock need not be a pure limestone; even if there is little calcium carbonate present its removal may weaken the rock and make

mechanical preparation easier. The optimum strength for this acid seems to be about fifteen per cent. No great accuracy is necessary, but it is a weakly dissociated acid and must obviously be used diluted. Above twenty-five per cent there is a tendency for bone to crack and the accumulation of calcium acetate buffers the action, making it very slow. Bone should not be left half-submerged in acetic acid, or calcium acetate will crystallize out on the exposed part of the bone. The expansion of this salt on crystallization can damage the bone.

Before starting work on a specimen, remove a small piece of the matrix, put it in fifteen per cent acetic acid, and watch carefully the speed of the reaction, its violence, and the extent to which the matrix finally disintegrates. Next examine the exposed surfaces of bone on your specimen. If there is the slightest doubt of their strength impregnate them with polybutyl methacrylate in methyl ethyl ketone and allow to dry for at least four hours before putting in acid. From the strength of the bone and the violence of the reaction noted while testing the matrix, the safe concentration of the acid can be judged; a lower concentration than fifteen per cent is often advisable.

The specimen, properly treated and dried, can now be put in acid. Examine the condition of the emerging bone frequently, especially at the beginning. Robust bone will need little more attention than the occasional change of acid, and the action can be left to continue until the specimen is free of matrix. Most specimens, though, need some attention during treatment, and the action must be allowed to continue only until any of the exposed bone is seen to need strengthening. If the matrix holding comminuted bone together is rapidly removed the bone will disintegrate unless it is strengthened as the action proceeds; very thin walls of bone covering cancellar areas filled with calcite may be ruptured by the pressure of evolved carbon dioxide. This is a very real danger with the exoskeleton of some agnathous fishes, such as *Pteraspis*, in which the cancellar middle layer is often filled with calcite and the violent eruption of carbon dioxide from this as the acid attacks it may blow off the outer ornamented layer. The action can be stopped at once by taking the specimen out of acid and pouring ammonia over it. Putting it straight into water will not stop the action immediately; indeed, if the accumulation of salts has buffered the action, the addition of water will start a short burst of activity. After this neutralization, the specimen can be put in water and left until it is free of salts, the water being changed at intervals. The washed specimen must now be dried. To insure that no soluble salts are left in the matrix, absorb as much water as possible from it with a cloth or tissue, before finishing off in an oven. If a white deposit forms on the surface of a specimen while it is drying, it must be washed again.

Fig. 1

When dry, the newly exposed bone must be cleared of softened matrix with fine needles and brushes under a binocular microscope. The art of good preparation lies in seeing what you are doing; use a good microscope lamp and magnify ten, twenty, or even sixty diameters. As the bone is cleared, strengthen it by impregnating with a diluted solution of polybutyl methacrylate in methyl ethyl ketone, and when this is quite dry continue the acid treatment. The skull and lower jaws of *Aelurosaurus* shown in Figures 1[1] and 2 were a severe test of this technique. As can be seen in Figure 1, the bone was badly cracked, comminuted in places, and very porous. It was never possible to leave it long in acid, strengthening being necessary at frequent intervals to prevent disintegration. The matrix broke down very irregularly in acid, leaving plenty of scope for the careful use of needle and brush. Although the man-hours spent were relatively few, the operation lasted many months. Figure 2 shows the

[1] The numbers in the legends are the registration numbers of specimens in the Department of Paleontology in the British Museum (Natural History).

Fig. 1. Skull and lower jaws of Aelurosaurus felinus *Owen, holotype, R.339, from the Karoo of Beaufort West, South Africa. Before preparation.*

Fig. 2. The same specimen as is shown in Figure 1, disarticulated after removal of matrix in acetic acid.

same skull and jaws after treatment; the mandible has been removed and the replacement dentition in both upper and lower jaws has been exposed. X-ray photographs of specimens so treated are as good as those of recent material; even the replacement teeth that have not erupted can be studied.

This technique is adequate for fairly small specimens, merely requiring care and some knowledge of anatomy. Larger specimens, such as ichthyosaur skulls and associated skeletons of all sizes, present other problems. If a heavy specimen is placed in acid and the acid is allowed to attack it from all sides, any delicate structures appearing on the bottom will be crushed by the weight above; any appearing at the sides may be broken when the specimen is handled. This can be overcome by limiting the action of the acid to one side of the specimen in the following way. Select a side of the specimen on which the more robust bony structures are exposed, preferably a flat side, for it is to serve as a base. Impregnate the bone exposed on this surface with polybutyl methacrylate in the usual way and allow to dry. Then give a coat of very diluted polybutyl methacrylate to the whole of this selected surface and again allow to dry. Coat this basal surface and some way up the sides from it with a silicone grease, such as Releasil No. 7, and follow this with a coat of rubber latex. On this build up a thickness of about a quarter of an inch of dough made from latex and kaolin and allow to dry. The specimen is thus partly embedded in a waterproof and resilient material, but it is not rigid. It can be made rigid by embedding the specimen in its rubber case in a variety of materials. Anything with a very low melting point must be avoided because of the need for repeated oven drying during preparation. Plaster of Paris coated with shellac has been used, but this is not ideal as it adds considerably to the weight, slowly disintegrates in acid, and takes a long time to dry. A mixture of polythene and paraffin wax has proved successful in the proportion of seven parts to three by weight;

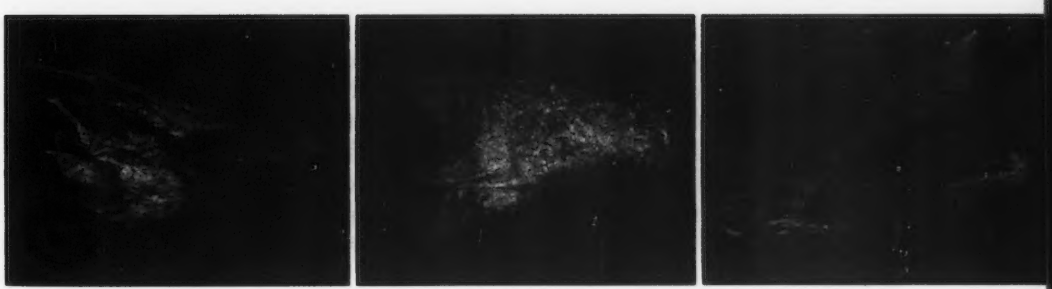

Fig. 2

it can be placed in an oven at 70° Centigrade without the occurrence of distortion, an advantage over normal paraffin wax which has a far lower melting point. For really large specimens a casing made of fiberglass mat and a polyester resin has been used. We have not yet completed this experimental work and hope to publish details later. The effect of the rubber coating is to limit the action of the acid to the exposed parts of the specimen, the top and part of the sides; the rigid base allows the specimen to be handled with ease and without risk of damage. By this method the posterior part of an ichthyosaur skull was dissolved out of a hard cementstone from the Lias; it was disarticulated bone by bone, adding considerably to our knowledge of the detailed anatomy of the head of this animal. A sketch of the original association of the bones should be made as they appear, and the bones marked in Chinese white ink. This "temporary backing" method can also be applied to associated skeletons and blocks of cave breccia, for which it allows greater control and therefore fewer breakages and a more efficient yield of the remains of small animals.

These techniques are not suitable for teleost skeletons, which are usually flattened along one bedding plane, or for the thin "bony" plates that form the exoskeleton covering the head and front part of the body of ostracoderms. These ostracoderm plates are finely ornamented on the external surface and smooth internally. The ornamentation is tightly keyed to the rock, so that when the rock is split open the unornamented smooth internal surface is the one usually revealed. Mechanical preparation of this fine detail takes much time, calls for great skill, and produces relatively poor results. As these thin plates are usually cracked, they fall to pieces as soon as the acid has removed the matrix. It was for them that we developed the "transfer method" (Toombs and Rixon, 1950).

One of the earliest users of the transfer method was John Young (1877), but it is better known through the work of Gerhard Holm (1890) on the preparation of graptolites. Holm stuck the exposed surface of his specimens to glass slides with Canada balsam and dissolved away the limestone with hydrochloric acid. Walton (1923) and Lang (1926), by using hydrofluoric acid, extended the method to include most fossil plants and chitinous invertebrates preserved in siliceous rocks. Bulman (1931), by using both acids, prepared specimens of *Palaeospondylus gunni* from a calcareous sandstone of the middle Old Red Sandstone; the skeleton of this tiny vertebrate is unusually preserved, as a hydrocarbon.

Our ostracoderm plates were too big and not flat enough to stick to glass slides. The first workable medium we found for them was the rubber cement Bostik, a strong adhesive, unaffected by acetic acid. The smooth inner surface of the plates was thickly coated with Bostik and allowed to dry for twenty-four hours before being put into the acid. The

fact that Bostik is opaque was no great disadvantage with these specimens, the inner surface being of no great importance, but when we came to consider the possibility of exposing the embedded parts of associated teleost skeletons, a transparent medium was essential.

We required a hard-setting transparent material that could be easily applied as a liquid, or a paste, to the exposed side of a skeleton, say eighteen inches in length, that would adhere to the specimen when set and would withstand long immersion in diluted acetic acid. The first satisfactory medium we found, and indeed the one we still find in general most suitable for all specimens we prepare by the transfer method, is the cold-setting polyester resin Marco Resin S.B. 26C. It was already in use in the British Museum as an embedding agent for zoological material (Purves and Martin, 1950). This plastic is marketed either in the form of the five constituent reagents (resin, monomer, catalyst, accelerator, plasticizer), which must be mixed according to the instructions given by the makers, or in the much simpler form of two liquids to be mixed in the proportion of 1/1.58 by volume to form the prepolymer. The prepolymer must be mixed accurately or the set plastic will be either too brittle and liable to craze, or too soft and easy to scratch. No mixing apparatus is necessary. The specimen is first cleaned by immersion for a few minutes in diluted acetic acid, thoroughly washed, and dried. A tray is made from thin aluminum foil to contain the specimen, with a quarter-inch margin all round and deep enough for the walls to project about half an inch higher than the highest point of the specimen. Into this tray the specimen is placed, with the exposed bone facing upward. Successive layers of prepolymer, none more than half an inch thick, are poured around the specimen until its highest point lies one-eighth of an inch below the top of the set plastic. Each layer must be allowed to harden before the next is poured. The rate of polymerization depends on the temperature; at normal room temperature (20° C.) it is about three hours. One can therefore either make up a fresh batch of prepolymer for each layer, or make up enough for the whole operation and keep it in the refrigerator while each layer polymerizes at room temperature. It is safer not to speed up the action by heating, for quick polymerization encourages cracking.

The fossil, embedded in set plastic, is now taken out of the tray and set aside for four or five days to allow the resin to mature. Even when this plastic has set its surface will still be sticky, but this residue can be cleaned off with a rag dipped in acetone. The upper surface of the plastic, through which the fossil can be seen, is ground flat with a coarse abrasive on a wet band-facer or, more laboriously, with coarse glass paper and then cleaned and dried. This flattened surface is then flooded with more prepolymer, and a thin glass plate is lowered on to it in the

same way that a cover glass is applied to a microscope slide, care being taken to see that no air bubbles are trapped. The glass cover gives far greater clarity than can be achieved by polishing and saves much labor. All vessels used in mixing and measuring the plastic should be cleaned immediately after use with a liquid detergent and hot water, followed by a wash in acetone.

If the fossil is in a large and irregularly shaped piece of rock, embedding it completely would be a waste of plastic. To avoid this waste, pour gelatine, molten paraffin wax, or carnauba wax into the tray instead of plastic, to within an inch or so of the fossil. None of these substances will interfere with the polymerization of the subsequent layers of prepolymer that are poured over it.

Excess plastic, wax, or gelatine is now cut or ground away from the back of the specimen to expose the rock, and the acid preparation can begin. It is better to stand the block on its side in the acid, or to support it with the matrix facing downward, so that the insoluble part of the rock falls away by gravity. With rocks of low calcium-carbonate content, this is especially necessary. With fine-grained rocks the insoluble residue tends to adhere to the surface, slows up and may virtually stop the action of the acid; it must then be brushed away. This must, of course, be done very carefully when bone begins to show through the matrix.

This plastic transfer method is particularly useful for very thin and badly cracked scales, such as the scale of *Strepsodus* shown in Figure 3.

Fig. 3

Fig. 4

Another advantage is that when the specimen is preserved only as a natural mold in the rock, the plastic takes a perfect cast of this, and no loss is sustained by the removal of the rock.

A matrix that will not readily dissolve in acetic acid may break down in formic acid; indeed, some workers prefer this acid (Rixon, 1949). It requires greater watchfulness than acetic acid, for it has been found that in concentrations above ten per cent it will attack some bone, particularly ostracoderms. It is also said to have a bad effect on the eyes and must therefore always be used in a fume cupboard. The very difficult preparation of part of the skeleton of the amphibian *Pholidogaster*, from the lower Carboniferous "Blackband Ironstone" of Gilmerton, Edinburgh, was made possible only by the use of formic acid. The general procedure is the same as for acetic acid. The two acids must not be mixed, for together they attack bone.

The techniques so far described depend upon the matrix's containing sufficient calcium carbonate for the rock to fall apart, or become softer, when this is dissolved out; they cannot be used on entirely siliceous rocks. Another acid technique, of much older standing, can be used on bones in siliceous rocks. The opposite course is followed, the bone being dissolved in hydrochloric acid, leaving a natural mold in the rock, as illustrated in Figure 4, a dorsal disk of *Pteraspis* showing the ornamentation and sensory canals. This technique was very effectively used by Steen (1931) and White (1935). From the natural mold a cast can be taken in rubber or polyvinyl chloride. Really spectacular results have been obtained by this method recently by A. D. Walker of Durham University on material from the Elgin sandstones, which are almost impossible to prepare by any other means.

Although most of these techniques are now extensively used in England and have been enthusiastically reported in American journals (Williams, 1953), there is still a reluctance on the part of some preparators to use acids. We hope that this article may do something to encourage them to give the methods a trial. We shall be glad to hear of results obtained and to help, if we are able, with any difficulties.

Fig. 3. Scale of Strepsodus portlocki *(Portlock), P.725, from the lower Carboniferous of Maghera, County Londonderry, Ireland. Transferred from an impure limestone to a block of transparent plastic.*

Fig. 4. Part of a dorsal disk of Pteraspis crouchi mattockensis *White, P.16832, from a fine siltstone in the lower Old Red Sandstone of Clodock, Herefordshire. The bone has been etched away with hydrochloric acid, leaving natural molds in the rock of the ornamentation and vascular canal system.*

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Designed for Display

A. E. PARR, SENIOR SCIENTIST
THE AMERICAN MUSEUM OF NATURAL HISTORY

Although many of us undoubtedly bear the burden of strong feelings about the external style and appearance of the structures in which we pursue our profession, it is the form and dimensions of the interior spaces that are of primary concern to the museum worker. Architectural interiors consciously and specifically designed for indoor display of the products of commerce or the treasures of the collector represent a very recent development in the history of western civilization. But the exhibition hall evolved so gradually from older forms that it would be difficult to establish any "firsts," nor would it serve any purpose to do so in this context.

It was only logical that the public museums, born of the curio cabinets of private collectors, should fall heir to the esthetic tradition and concepts of private residential, manorial, or palatial architecture. In fact, the architecture itself was often inherited along with the tradition and the collections. As the museums grew larger, it was obviously from the palatial settings for gala events of state that they drew the inspiration for their own great halls, which became large and ornate spaces extending through most of the height of the building, with galleries sometimes connecting with lesser rooms in the wings, sometimes existing as galleries only.

In spite of their appearances and dimensions, the early museum halls were actually functional in purpose if not in style. The main floor and the galleries did provide the setting for the display of the museum's collections and exhibits, and were fully intended to do so. The main hall of the Royal Scottish Museum in Edinburgh, opened in 1875, is a fine example of great historical interest, and so is the Galerie de Zoologie, which was inaugurated in 1889 at the Muséum National d'Histoire Naturelle in Paris. The attractive main hall of the Koninklijk In-

stitut voor de Tropen in Amsterdam, begun in 1913 but not completed until 1923, is of a later date, but falls into the same category of space created for utilitarian exhibition purposes, however ornamental in design.

While many great museum halls continued to be built and used for exhibition, it is interesting to note a tendency to revert to the original purposes of the architectural tradition in which these halls were designed. During the early years of the twentieth century, a purely ceremonial great hall, larger than any of the exhibition rooms, appeared in many museum plans. According to its location in the total structure, it might be viewed as an entrance lobby in the grand manner of the great opera houses, or as a central hall of state connecting the surrounding exhibition areas. These great halls did provide enviable settings for festive occasions, but in daily life served mainly to impress the visitors with the dignity and solemnity of the institution they had entered. To the extent that this might help to induce better behavior and a more appreciative attitude among the visitors, one should not too lightly dismiss the value of including a space mainly designed to impress among those directly designed to educate. Perhaps the handsomest ceremonial hall actually built for museum purposes, and not inherited with a palace, is that of Nordiska Museet in Stockholm. Its massive beauty stands in interesting contrast to the slender structural elegance of the great exhibition halls in the Zoological Museum in Paris and the Scottish Museum in Edinburgh. True to its conception, the main hall of Nordiska Museet held no exhibits when the photograph shown in Figure 4 was taken in 1907.

The vision of a luxurious and awe-inspiring ceremonial hall will probably always offer its temptations to museum donors and directors. But as the twentieth century progressed, concern for economy grew. In later plans many institutions have tried to achieve a compromise between the purely ceremonial and the entirely utilitarian great hall by installing suitable ornamental samples from their collections, essentially as decorations out of context, serving to call attention to the diversity and wealth of the museum's treasures, without being an integrated part of its educational exhibits. The great hall of the Chicago Natural History Museum is a good example of such use of a central and dominant space.

While the dreams and ambitions of museums sought expression in

Fig. 1. The main hall of the Royal Scottish Museum in Edinburgh. Opened in 1875.

Fig. 2. The great hall of the Galerie de Zoologie, Muséum National d'Histoire Naturelle, Paris. Inaugurated in 1889.

Fig. 1

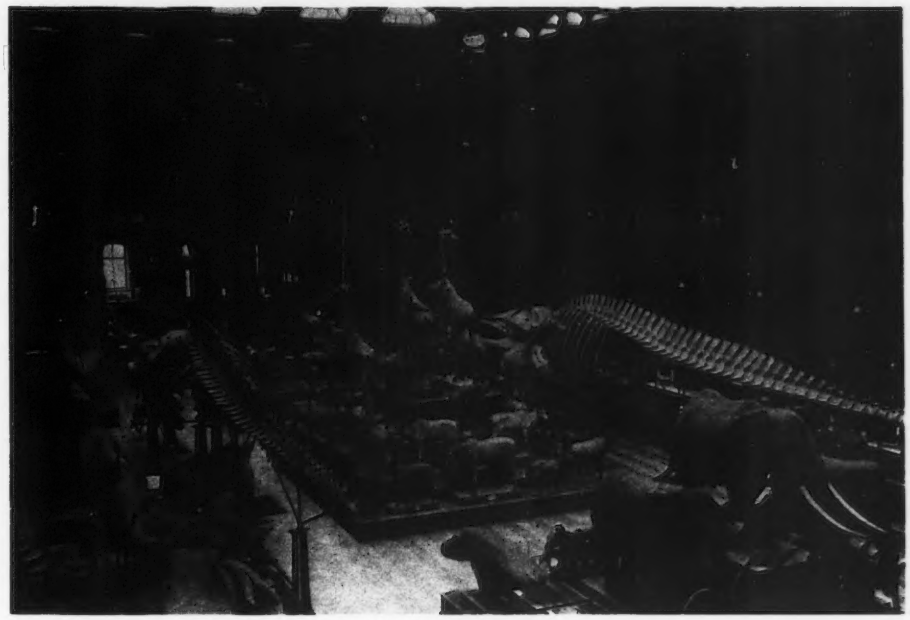

Fig. 2

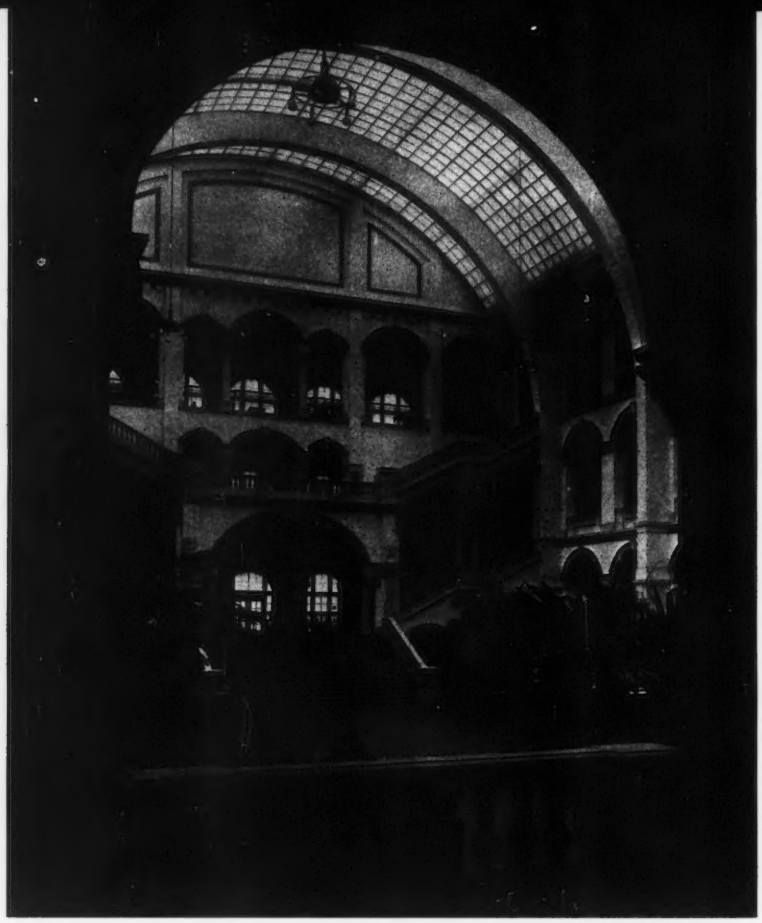

Fig. 3

their lofty great exhibition halls, we find commercial establishments vying with one another for the most impressive display of their goods in splendid vistas under truly breath-taking domes. Even an insensitive person would find it difficult not to react to the dramatic use of space and style in the interior architecture of such great stores as Au Printemps in Paris.

Between the two world wars economy of space in new construction became a necessity in many parts of the world, and simplicity of design

Fig. 3. A view of the main hall of Koninklijk Institut voor de Tropen in Amsterdam. Begun in 1913, completed in 1923.

Fig. 4. Great hall of Nordiska Museet in Stockholm. Photographed at the time of its opening in 1907.

Fig. 4

Fig. 5

soon became fashionable everywhere. Gone from the new plans was the opulence of vast empty spaces both in the museums and in the market places. Even many of the great halls that already existed in both kinds of establishments soon disappeared into a layer cake of new floors and ceilings. Economy of operation became as important as economy of construction, and the taste of the new era placed little premium upon spaciousness as an elegant virtue in itself. If they escaped the fate of structural alterations, the stately new museum halls so recently created for purely ceremonial purposes were likely to be pressed into service as additional exhibition areas.

Many of the halls that came to an end were tawdry and ostentatious. Much of the new design was good, attuned to the mood and tempo of a crowded and restless age. A glance into the new sales floors of Au Printemps is tempting and exciting. The great dinosaurs rear their giant height with attractive dignity under a flat ceiling. But much that was lost was gracious and inspiring, and much that was not allowed to be born could have provided oases of serenity and a stimulating change of pace in our crowded existence between rectangular walls under flat ceilings.

In the case of the habitat halls of the natural history museums there are also special reasons for simplicity of form and dimensions. If an assertive design of high walls and tall ceilings above his head impresses itself upon the consciousness of the spectator, it makes it ever so much harder to create in his mind an illusion of infinitely higher blue skies within the low dimensions of the exhibit before him. And the light that surrounds him must emanate largely or entirely from the view he is looking at, if the pattern of sunlight and shadow under painted skies is going to carry conviction, for the same reason that the light in the audience is dimmed when the curtain goes up on the stage. But tall ceilings hidden in dimness or darkness would make little sense from any point of view. And so we have two separate and special reasons why the ceilings of habitat halls should be low and featureless, and the wall surfaces plain.

But simplicity of design, like simplicity of mind, is no guarantee of charm. It can also be simply boring, especially when offered in large doses. How to avoid the boredom of monotony within the austere limitations imposed upon design by the demands of economy and of currently modern taste therefore becomes a very serious problem.

In the great halls of museums and department stores the scale of the objects on display and the scale of the space in which they find their

Fig. 5. Great hall of Chicago Natural History Museum. Opened in 1921.

setting are so different that the architectural container and its contents function on entirely different levels of visual impact, and can be treated as virtually independent esthetic elements. The style and ornamentation of the hall bear no relation to the form and dimensions of the exhibits, and do not need to, just as the beauty of a human face is independent of the esthetic qualities of its microscopic histology, and vice versa.

This esthetic divorce between large-scale container and small-scale contents will be clearly revealed if we submit Figures 5 to 8 to close scrutiny. That it springs from the difference in dimensions, and particularly in dimensions of height, becomes obvious if we conduct the mental experiment of imagining the embellishments of a lofty hall as a background for the dinosaurs under the flat ceiling of Figure 12, or competing with the luxuriant display of goods at close quarters in a space such as that shown in Figure 9.

The great halls therefore did, and still could, offer splendid opportunities for relief from monotony by playing architecture against display, instead of fusing the two into a completely integrated whole, from which there is no escape. When the near scene of the exhibits begins to pall, the larger vistas will rest the eye and refresh the mind with a totally different set of impressions of another visual environment, just as the eye

Fig. 6. Au Printemps, Paris. Grand hall, Anciens Magasins, in 1923.

Fig. 7. Au Printemps, Paris. Hall Binet, Nouveaux Magasins. Photographed after the fire in 1924.

Fig. 7

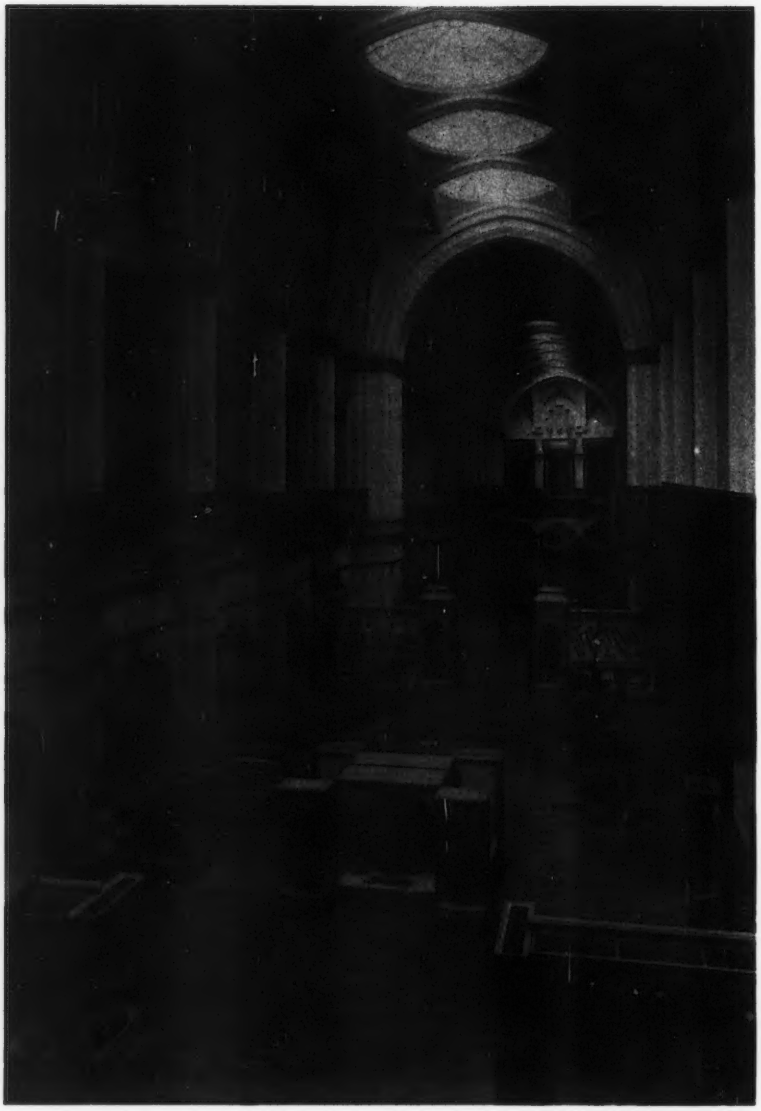

Fig. 8. Great hall of Nordiska Museet photographed in 1951. Compare with Figure 4.

Fig. 9. Au Printemps, Paris. Ground floor, Anciens Magasins, 1949.

Fig. 10. Au Printemps, Paris. Small hall on ground floor of Nouveaux Magasins in 1954.

and the mind may seek the view from the window after too much reading.

Paradoxically, our reasoning leads to the conclusion that the great halls are best used for the display of the smallest objects, which will insure maximum difference in scale and minimum danger of esthetic conflict or interference between container and contents. A pattern of small, discrete objects, arranged separately or in showcases on the main floor and the galleries of a monumental hall becomes part of the texture rather than of the form of the larger whole. It does not take much imagination to visualize, by mental extrapolation from some of the illustrations accompanying this article, how increasing the size of the objects contained actually reduces the esthetic effectiveness of some of the finest halls conceived on the grand scale, unless, of course, the objects are directly related to the architecture—historically, stylistically, and in their arrangement—as in historical buildings and palaces. But exceptions of this kind do not ameliorate the problem for the natural history museums. These, however, might do well to consider a re-introduction of the ornate spaciousness of great halls and open galleries for the display of such things as insects and minerals and many others, and to relieve the tedium of long strolls through a maze of cubicular rooms under low ceilings.

When the objects become larger they first approach the scale of the decorative elements of architectural design. Since neither the curator nor the manager of a store can be required to make a choice of specimens or products that will always harmonize with a permanently predetermined

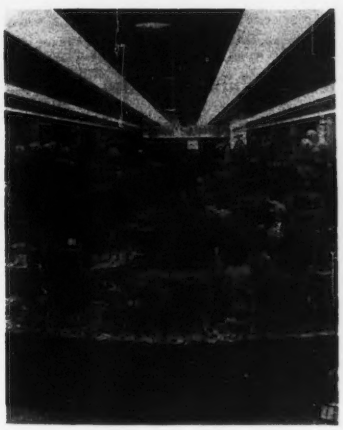

Fig. 9

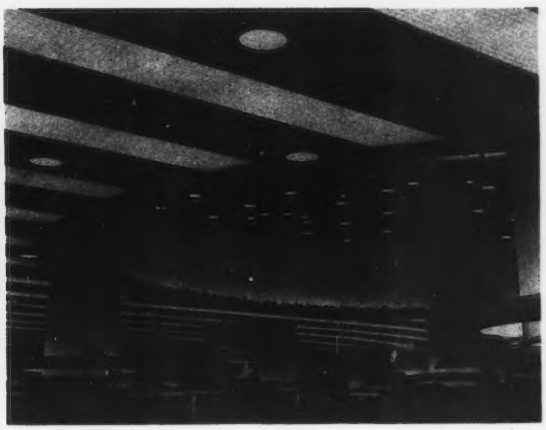

Fig. 10

ornamental motif, structural ornamentation proves an esthetic liability in the actual use of the space, and a smooth simplicity of all planes and curved surfaces becomes a requirement.

But the need for simplicity applies only to the surfaces and not to the larger forms surrounding objects of medium size. On the contrary, exhibits of this kind offer particularly good opportunities to create variety in the vistas facing the visitor, by molding the general shape of each hall to fit the organization of its subject matter rather than the form of the objects it contains.

Virtually any theme that we may try to develop in our museum exhibits has an inner logic suggestive of a geometric pattern, as the triangle has long been symbolic of the interplay of three independent forces, whether it be in human relations or in the inorganic world. In some subjects our concepts and our knowledge seem to radiate from a central idea, premise, fact, or definition to which we must return again and again. The logical sequences of other topics form closed cycles of interrelated causes and effects, following one another in endless repetition around a perimeter without ever focusing upon a center. Still other themes unfold in an open progression, never returning upon themselves, although their direction may change from chapter to chapter.

A recognition of these infinitely varied patterns gives us opportunity to mold the shape of each exhibition space to the configuration inherent in the logic of its subject, thereby providing subtle guidance for the orderly study of what is immediately before the visitor, and, at the same time, a measure of relief from monotony in the cumulative experience of his museum visit. It is not enough to avoid repetition of specimens; we must also avoid repetition of the larger impressions which the vistas of each hall present to the public. In a large museum it is impossible to expect that our visitors will be interested in every specimen or even in every hall they see. But it is quite within possibility to make them feel that they are having a pleasant and diverting walk through all the halls they wander through, even where the actual exhibits hold no particular

Fig. 11. Hall of Reptiles and Amphibians. The American Museum of Natural History. Photographed in 1928.

Fig. 12. Tyrranosaur Hall after modernization in 1956. The American Museum of Natural History.

Fig. 13. View of habitat groups in Hall of American Forests. The American Museum of Natural History, 1958. Simplicity of surfaces, variety of larger forms of space.

Fig. 11

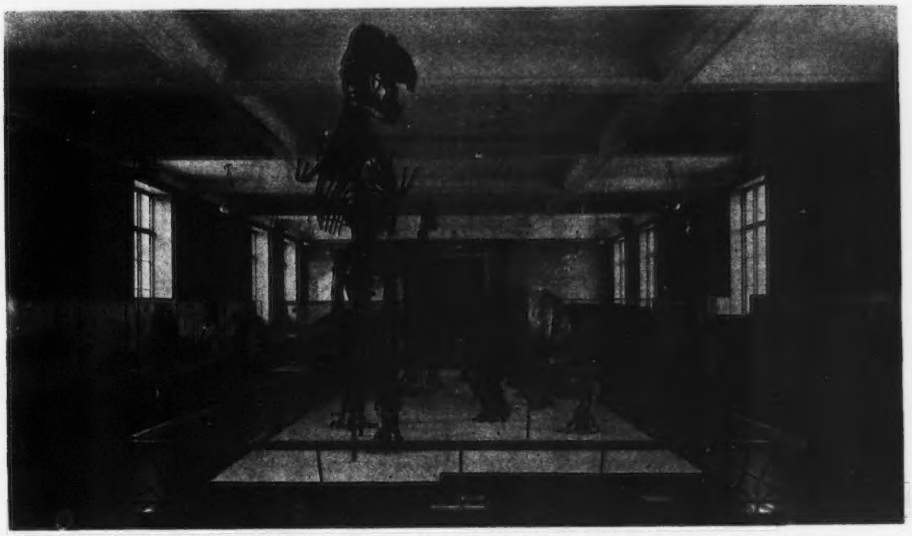

Fig. 12

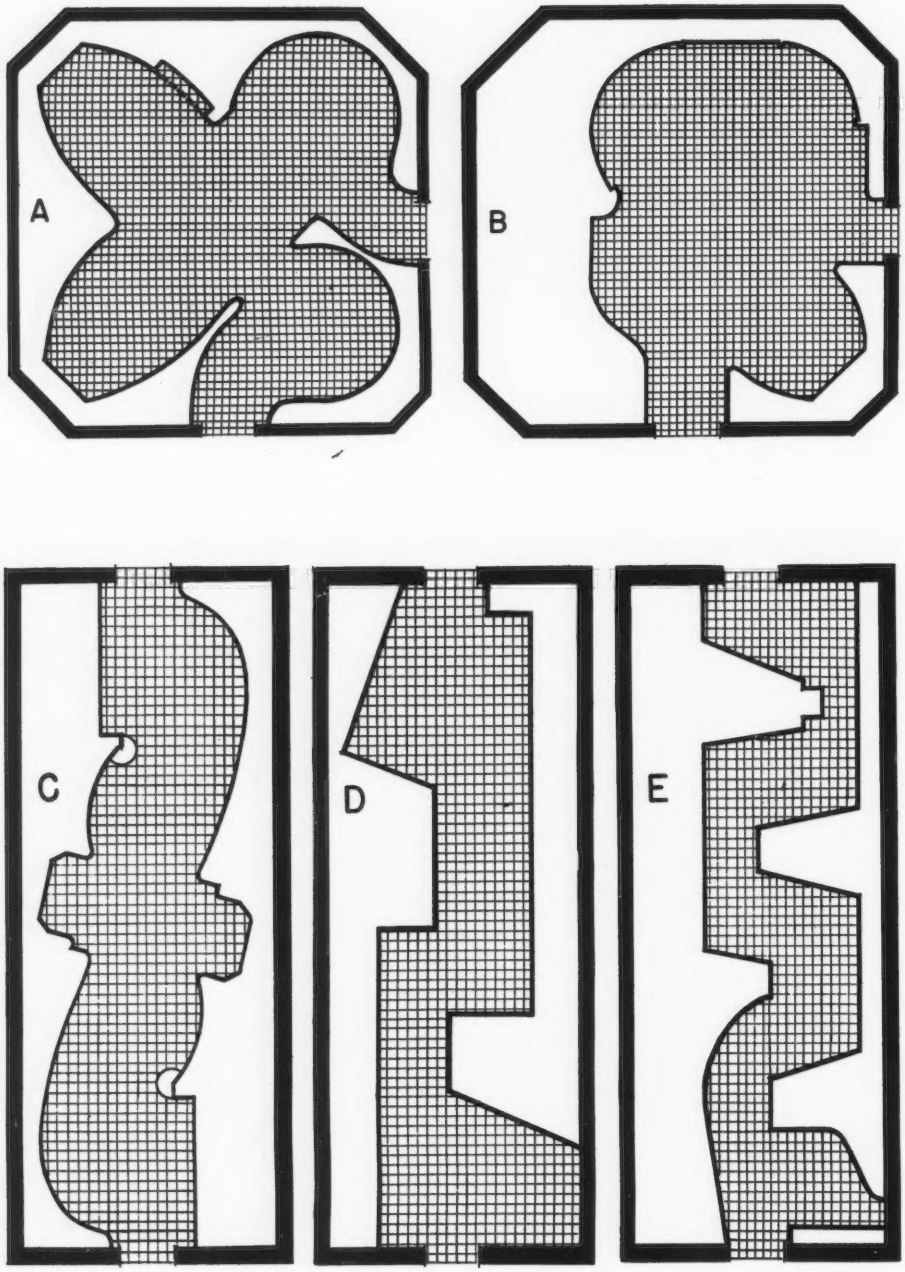

Fig. 14

interest for them. To create this impression of an enjoyable tour through the museum as a whole, and to provide for a pleasing and profitable time spent with the particular exhibits of one's choice are the twin goals of museum architects and exhibition designers.

In the display of merchandise, it is rarely necessary to submit to a restraint imposed by an inner logic in the relationships between the articles shown. The store can therefore vary the shape of its space for the delectation of its customers, with greater freedom and abandon than are permitted to the museum. But the same principles apply to both. When the space is large and the objects small it is permissible, and often desirable, to use surface ornamentation as a means of enriching the general scene. With smaller space or bigger items simplicity of surface becomes mandatory, but diversity can be created by varying the larger forms of space. When the objects are very large, however, even this alternative is eliminated. Molding a hall to complement the skeleton of a *Brontosaurus* could undoubtedly be done, but it would create a combination of such esthetic inflexibility that the space would be of little use for anything else. In the world of commerce a showroom for locomotives or airplanes should have a simplicity of form as well as surface that might well be found boring as a setting for the display of smaller merchandise.

We have discussed the parallel trends away from large and lofty halls towards low and snug display areas which have developed more or less simultaneously in museums and department stores. There are also some other types of buildings designed for display within their shelter. Permanent halls for temporary fairs and exhibitions have had an interesting and very checkered architectural history, which will not be discussed here, except to point out that the fairgrounds have never joined the museums and stores in their flight from the use of large and open indoor space. The fine early example of London's Crystal Palace as it looked in 1851 has already been illustrated by Witteborg in the first issue of CURATOR (volume 1, number 1, 1958, p. 33). The beautiful, vast, and unencumbered space of the brilliantly designed and recently completed Palazzo Esposizioni in Turin must give any museum director food for thought in his own planning for the future.

Among its many functions the Bouwcentrum in Rotterdam includes the

Fig. 14. Random suggestions of floor plans to fit the organization of subject matter within the structural limitations of space indicated by the heavy black outlines. A. Radiation from a focal concept. B. Peripheral sequence in a closed cycle of interrelationships. C, D, and E. For themes unfolding in open progressions.

presentation of exhibits of a temporary kind along with others of a semi-permanent character, all having to do with building and housing and related subjects. The centrum is neither a museum nor a fair but partakes of some of the best features of both. In its first exhibition hall, opened in 1949, the Bouwcentrum made a very original, ingenious, and successful attempt to combine a feeling of airy spaciousness with an actually quite crowded use of the space. The hall is virtually circular (hexadecagonal) and three and a half stories high, with a dome above. Three peripheral balconies, including the one at the entrance level, completely surround the central space, which has a sunken main floor surmounted by two circular floors in the center of the hall, at levels different from those of the balconies. The outside diameters of the central floors are substantially shorter than the inside diameters between the balconies, leaving a considerable volume of open space, traversed only by "flying" stairs and ramps, between the central and the peripheral tiers of floors. By this arrangement the hall as a whole retains its unity of space, fully exposed to the visitors. The incomplete floors and partitions become part of its general design instead of cubicular subdivisions of its space. The idea behind this plan is one that seems well worthy of further development and application to museum architecture.

Fig. 15

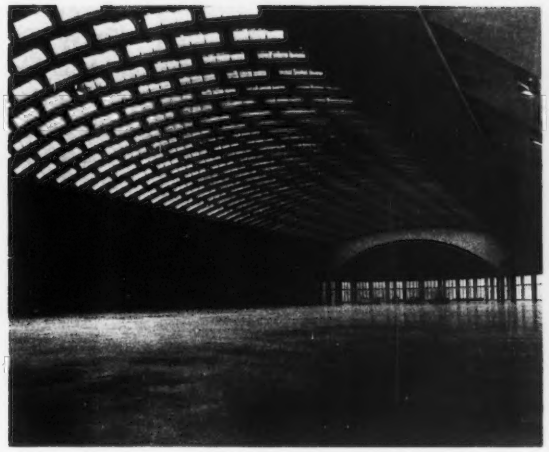

Fig. 16

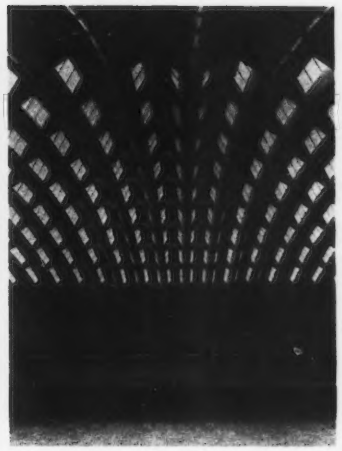

Fig. 17

Each museum or store usually accommodates only a single enterprise using display among the tools of its trade. Exposition halls fulfill the temporary needs of different organizations and individuals. The arcade or galleria represents yet another genus of architecture in which many small and independent establishments seek permanent opportunity to show their wares and conduct their business. The arcade typically tries to maintain the illusion of being an outdoor area under shelter—a square, court, street, or alley spanned by a roof between surrounding buildings housing the stores with their display windows.

In the famous Galleria in Milan two wide streets, for pedestrians only, cross at a central plaza. The surrounding façades rise five stories in height before they reach the sheltering roof. Two "outdoor" restaurants within the Galleria accentuate its spaciousness and one's feeling of being in the open.

Fig. 15. Brontosaurus Hall, The American Museum of Natural History, after modernization in 1953. Simplicity of general form of space as well as simplicity of its surfaces, for the display of large specimens.

Fig. 16. Great hall of Palazzo Esposizioni in Turin. Note cars in background for scale.

Fig. 17. Detail of balcony and ceiling. Palazzo Esposizioni, Turin.

The arcades of other countries are generally low and narrow, not intended to set the stage for gracious leisure, but rather to serve more simply as protected passages leading hurried crowds to the stores, and by their display windows, in less benevolent climates. But even those that close at night, such as London's Burlington Arcade, usually have in common the pretense of being part of the city's public street system, passing between or tunneling through its buildings. A splendid example of a different but related type of edifice is offered by the Cleveland Arcade, which does not seem to have received the recognition it so truly deserves. The Cleveland Arcade is not reached directly from the street, but only by passing through ordinary lobbies that separate the arcade from the sidewalks at either end. Fine stairways between the two lower levels, bronze railings and lampposts, and dramatic proportions give the four-story arcade an aspect of theatrical opulence. In its general concept the Cleveland Arcade might have borrowed ideas from the Galleria of Milan, from the Crystal Palace, the balconied great halls of many museums, and the grand domes of the great stores. Whether its architects did, or not, the results are gratifying and interestingly different.

In the suburban shopping center of today the urban arcade of other days reappears in a modern guise adapted to the age of the automobile. The principle is the same. In the integrated shopping center the premises of many stores and establishments are gathered under a single roof or within a few structures arranged around courts and avenues entirely reserved for a public strolling leisurely about on foot. Although they owe the advantages of their locations to the automobile, the new centers continue the old galleria's rebellion against all vehicles, making the feeling of sanctuary an essential element of their appeal, now as always.

It is the shopping centers with decked-over courts and avenues for protection against inclement weather that particularly deserve the attention of all museum planners. A fine example is Southdale designed by Victor Gruen for a suburb of Minneapolis. One of the great problems of the larger museum is how to serve the needs of the seriously interested and well-informed visitors without inflicting a too heavy diet of details on those less advanced in their appreciation of the articles shown or in their understanding of the subjects illustrated by the exhibits. The idea of a physical separation between exhibits aimed at different levels of knowledge presents itself again and again and finds partial expression

Fig. 18. Bouwcentrum, Rotterdam. A view of the main hall, opened in 1949.

Fig. 19. Section through the main hall of the Bouwcentrum.

Fig. 18

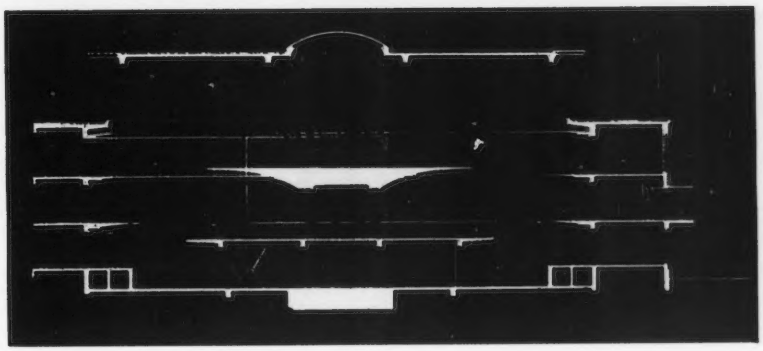

Fig. 19

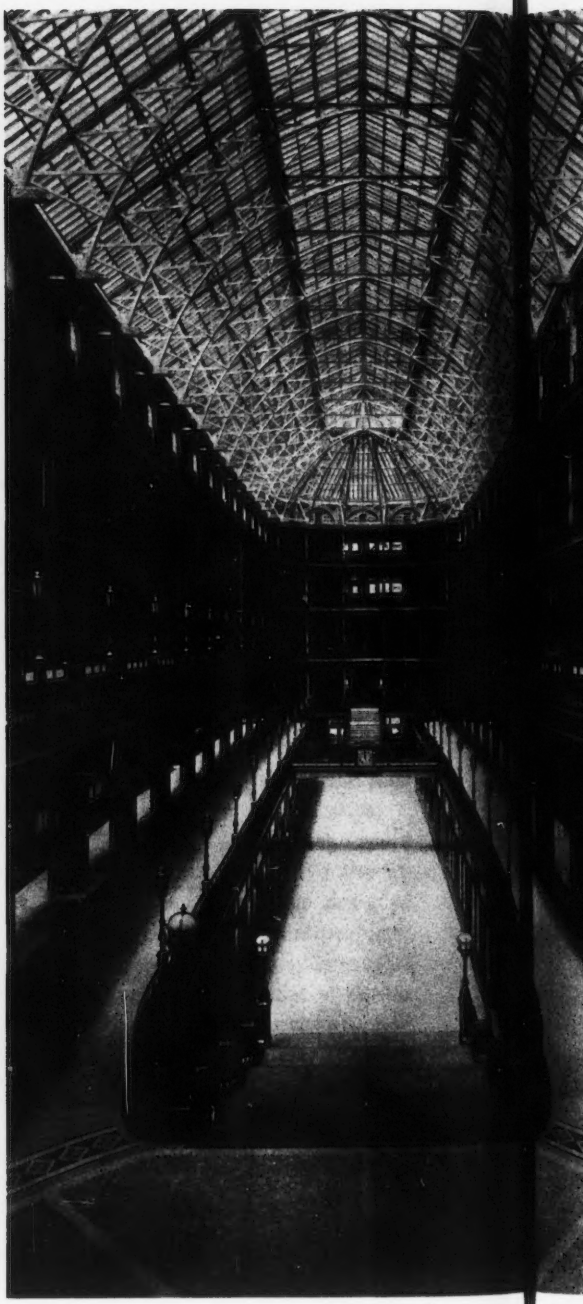

Fig. 20

Fig. 21

in the children's museum on the one hand, and in the research collection on the other. But there is a vast range of knowledge and interests between those served by exhibits for general public pleasure and education and those that can be satisfied only in the research collections. No general solution for the problems of this intermediate range has yet been put forward. Perhaps an answer is suggested in the design of the shopping center and in the behavior of its visitors.

The creators of the best-designed shopping centers have been pleasantly surprised by the large number of people who flock to their courts and plazas even during days and hours when the stores are actually closed. Like any other retail district, the shopping center has its sightseers and window-shoppers who come to enjoy the spectacle without personal involvement in its more serious purpose. But there are no barriers to keep the passive observer in the court from becoming an active customer in a store, whenever his interest is sufficiently aroused in a setting primarily designed to draw his favorable attention to what he sees.

Is not this anonymous intermingling of window-shoppers and serious customers precisely the problem that confronts the museums in their approach to general adult education through the medium of their exhibition halls? And might it not be possible that the shopping center of today has already revealed to us the architectural form of the museum of tomorrow?

There would be covered courts for the larger objects and ensembles—a dinosaur court, a court of the American Indians, and many others—each presenting to the casual visitor the dramatic essence of a subject, with a brief outline of its logical structure. There would be rambling, covered avenues between display windows where the stroller would be further exposed to the beauty, order, and meaning of the various disciplines. And there would always be the "shops" waiting behind open doors for any visitor with a desire to become absorbed in the fascinating details of the museum's departmental exhibits. The casual seeker of an afternoon's diversion would not be forced to attend visual dissertations by exhibits that would be boring to him, but would always be free to enjoy them without the slightest let or hindrance whenever he should feel so inclined. Space for offices and laboratories, collections and library stacks could be located on upper floors above the "shops" and avenues, where

Fig. 20. Galleria Vittorio Emanuele in Milan, completed in 1877. Picture taken from above the central square.

Fig. 21. The Cleveland Arcade, Cleveland, Ohio. Opened in 1890.

Fig. 22

there is no need for excessively wide clear spans at the exhibition level. It would be quite easy to make provisions in the general layout for almost infinite horizontal expansion. Perhaps we would still be far from the ideal solution, but, until better suggestions are offered, it might pay us very well to turn to the planners of the shopping centers of today for their ideas on the museums of tomorrow.

Fig. 22. Where street and court meet under roof. A corner of the Garden Court, Southdale shopping center, Minneapolis.

II/4 1959

The Archeologist's Problem of Getting Non-artifactual Materials Interpreted

STANLEY J. OLSEN, VERTEBRATE PALEONTOLOGIST
FLORIDA GEOLOGICAL SURVEY

Many museum departments, whether they be concerned with mammalogy, paleontology, botany, or geology, reserve certain sections of their storage stacks for "material to be identified." At what time this material is identified or interpreted depends largely upon the tastes and interests of the curator in charge and, more important, whether or not he can apply the information gained to *his own particular research*. More often than not, at least in the majority of cases known to the writer, the archeologist's collections of animal bones are way down on the curator's list of materials to be worked on in the immediate future. Why is this true? For one thing, the expert called upon to interpret the archeologist's material has his own interests and research problems, the suggested project may not interest him at all, and he cannot be expected to shift his research interests immediately to those of the archeologist. Very often a curator will take on the duties of interpreting the non-artifactual material as a personal favor to the archeologist rather than because of an interest aroused by the specimens themselves. Even this approach is not always satisfactory, because the prime reason for doing this work does not stem from the problem at hand and usually results in many letters from the archeologist, spaced months apart, usually beginning, " I know how busy you must be but I am quite anxious to have the report of your findings, etc."

From the general museum mammalogist's point of view, this lack of interest is understandable. Why should he take on the difficult and time-consuming task of identifying bone remains from an archeological site? Aside from the lack of interest in a non-related problem, he gets little or no credit except a by-line in the acknowledgments of the main paper. Identification itself can be drudgery or hack work, discounting the very

rare chance of finding an unusually interesting scientific variant among the usual and normal collections of fragments. However, if the examiner of bones were to interest himself in the ecology, range of species, and variation of individual species, then there may be more to attract him than there is with just the mere identification of the remains.

Archeologists are not primarily satisfied with a long list of genera or species from a particular site but wish to know what these animals indicate as to the past environment or conditions that may have affected the community of the peoples being studied. For instance, what were important food animals? Does the presence of a raccoon indicate a wet marshy environment? Are the artiodactyl remains domestic cow or buffalo? These and similar problems are better solved by the trained mammalogist than by an archeologist with a smattering of osteological knowledge.

There are many identifications and interpretations that the archeologist can make with the aid of comparative skeletons and the keyed publications on osteology, but the finer interpretations that have to do with the variations and ecology of a group will still fall to the expert in these matters, the curator of one of the various special departments of a natural history museum.

Too often a collection of fragments, be they of bone or metal, are given to a student for identification as part of his training. This is all well and good, providing the student is supervised and his identifications are checked (and what curator has the time to do so even if he were so inclined?).

Identification alone is not enough, as an erroneous solution to a problem could result from too little knowledge of an over-all picture concerning the material under examination. Take the example of military insignia that turned up in an excavation of one of Florida's Seminole War fort sites. In this case the problematical material was military buttons of the regular United States Army issue of the period of the War of 1812. The military fort in this example dated from 1835 to 1842. To make the problem more confusing, General Andrew Jackson's troops did occupy garrisons a few miles north of this area during the period of about 1812, but not at the place from which the 1812 insignia was collected. Various state militia companies from Georgia, Alabama, and Tennessee were used to strengthen the garrisons held by the Federal troops during the conflict of 1835–1842. The militia companies are known to have been outfitted with surplus equipment from the period of the War of 1812. Most surely, then, these early buttons from a fort site having a later date can be explained in this way, but had a date been obtained from identification of the insignia alone, a quite different picture would have resulted.

It goes without proving that a poorly made or incorrect identification is much worse than none at all. Also a "general" identification can be mislead-

ing, as in the case of horse teeth from an Indian site. When the faunal list from a site such as this carries an identification of *Equus* sp., this could indicate the presence of the modern horse, *Equus caballus,* and hence point to a post-Columbian age. But it might also be a tooth from one of the pre-Columbian Ice Age horses such a *Equus leidyi* that found its way into the site as an item of some early medicine man's bag. (Vertebrate fossils have been used for this purpose.) Only the expert in these matters could distinguish between the two forms and give a correct interpretation to the specimen.

One fact not usually discussed by the various groups of anthropologists that have tried to solve this over-all problem of interpretation of non-artifactual material is that many curators of vertebrate groups are not trained osteologists. This is particularly true among ornithologists, so that even if a curator of a department could be interested in undertaking a problem, many are not qualified to do an adequate skeletal study for the archeologist.

That paleontologists are consulted concerning osteological identifications is owing in part to their experience in dealing with broken or fragmentary bones as compared with the complete skeletons that are referred to by the curators of recent animals. But here again, as with the mammalogist, the average paleontologist is not worrying because of extra time on his hands nor is he apt to be searching around for a problem, so that material sent in to the vertebrate paleontologist is treated in the same manner as that which is referred to the mammalogist or botanist and is relegated to the corner "temporary" storage, to be compared at some future date.

How then can the archeologist hope to remove this stumbling block in the path of his researches? The committee of the National Research Council (1957, Publication 565) put forth many suggestions and possible solutions, from one of a central clearing house for all materials to that of hiring a mammalogist or other expert whenever a particular need arises. To this last suggestion I can only state that an arche-osteologist or prehistorian, or whatever one chooses to call him, must be able to earn a living and have a secure permanent position or he will turn to other fields. As Dr. A. S. Romer stated in one of his Annual Reports of the Museum of Comparative Zoölogy, "Inadequate salary prospects have undoubtedly caused many men, who would have been successful in museum work, to turn to better paid fields; a scientist cannot work at his best with a mind disturbed by financial worries."

One solution that has not been put forth is that of establishing a staff position for the specialist or prehistorian in an anthropology department of a large university, which already has research collections of mammals, birds, historical materials, and so on, so that these necessarily large

collections would not have to be duplicated as would be the case in a new type of laboratory or central clearing house. It is an accepted fact that adequate comparative material is not to be found outside museum collections.

The interpreter of non-artifactual material has to be as interested in the problem as is the archeologist himself. This can only be brought about if the curator is a member of an anthropological staff and has the same interests and every-day contacts with the material as does the archeologist, rather than the usual five minute pep-talk that precedes the placing of the box of bones on the specialist's desk. Of course, one snag to be overcome before a specialist, such as is needed for archeological interpretations, can be taken on the staff of an anthropological department is the abolishment of the regulations that prevent the hiring of non-anthropological experts in a department of anthropology.

The ideal solution to this over-all problem would be to have several teams of experts, located at various widely separated places within the United States, so that the "regional type" of detailed knowledge could be applied to the archeologist's problem, rather than one central clearing house to which material could be sent from any and all widely scattered points. The expert working in such a central laboratory could not have the detailed knowledge of a small area that the curator of a department in a regional laboratory would possess. However, the actual setting up of *one* environmental laboratory would be a vast stride forward, and a multiplication of this effort is not foreseeable in the near future.

Without a shadow of a doubt the ugly mention of "funds" would rear its head, but it has been the writer's experience that, when a proposed project has enough real value to enough people, the funds are usually obtained.

II/4 1959

The "Please Touch" Exhibit

JANET PINNEY, EDUCATIONAL DIRECTOR AND CURATOR OF TOYS
MUSEUM OF THE CITY OF NEW YORK

To the ears of the young so accustomed to hearing "please do not touch" when they go to museums, the words "please touch" have a magic sound. The visit of the scheduled classes to our "Please Touch" Room, as one part of the day's program, is bringing forth the results we had hoped. Each child is learning about the unfamiliar objects of an earlier era by handling them himself. At the same time he is gaining a respect for the past through the careful touching of the objects. Interestingly enough, the psychological effect on the child is such that, because he can touch some things, he is not so apt to run his hands over everything in the museum.

What is our "Please Touch Exhibit"? We have two. One is a family room, part kitchen, part living room, of a Dutch house. Because the fourth-grade children in the New York City schools are studying life in New Amsterdam, this seemed the best phase to reconstruct for them. Household objects that mean something to children needed to be displayed in their proper setting. Through the interest and cooperation of the Children's Art Committee of the Junior League of the City of New York, Inc., we drew up a possible plan. This was approved by the League, which then voted the necessary funds for the construction and purchase of antique objects, though the Museum did the actual buying. Our educational staff and representatives of the League, after much research, settled on the idea of using the end of our fourth-floor small auditorium for our Dutch room. On the back wall we constructed the high mantelpiece, painted our Dutch tiles, made our fireplace, and hung a kettle over the logs. Next it seemed wise to have two flat screens, each nine feet ten inches long, seven feet four inches high, to close off the end of our room. When rolled back they represent the interior side walls and on them we have our Dutch door, where the children can actually lift up the latch and open the door; on the other "side wall" we have our cupboard bed, whose doors open, to the delight of the children. When the screens

Fig. 1

Fig. 2

Fig. 3

Fig. 4

are closed, they represent a street scene. What scene should it be? Consulting the Castello Plan of New Amsterdam of 1660, we found an ideal spot—the corner of Broad and Pearl Streets. Here was the home of Hendrick Jansen Vander Vin. He bought it from the burgomasters at public sale on January 12, 1658. Mr. Vander Vin was a well-educated man, an accountant, who had been working for the West India Company in Brazil.

In 1653 he and his wife, Wyntje, came to this country from Holland. He was chosen a Schepen in 1657 and again in 1659 and was a churchwarden in 1658. He later moved to Harlem where he served as voorleser and school master. In 1672 he was made secretary of Harlem, a post that he held until his death in 1684. It is rather fitting that we have chosen the Vander Vins as our Museum family, for his last years were spent not very far from the Museum's present location. But we have taken a great liberty and given the family something they did not have—children: a boy, Hans, just about the age of our fourth-grade children, a blonde girl, Gertje, of almost the same age, and a baby, Anna, in a cradle. The children and the mother are all dressed as the family would have been in the 1660's: Hans with a Dutch haircut, brown baggy trousers, jacket, and white linen shirt with a large square collar, knitted socks, and little felt slippers; Gertje in her soft yellow dress, blue apron, and white bonnet; baby Anna swaddled and lying in her cradle; and last, but not least, Mother Vander Vin in her long, full, blue skirt, soft red blouse, homespun apron, and simple bonnet. Do not suppose that we have not been asked where father is. Dressing father was going to create such a problem that our excuse has been that he is out trading with the Indians for beaver skins, similar to the ones the inquiring children are going to feel.

What objects have we for the children to touch? Wooden shoes, leather fire bucket, pewter plate, porringer and mug, brass milk jug, iron pot which they can move up and down on the chain over the logs, foot warmer, bed warmer, candle mold, wooden cookie mold, homespun table cover and oriental rug on the tables, ice skates, churn, and the cradle. Not all of these are of the seventeenth century; many are of the late eighteenth, but the important thing to the children is that they are old

Fig. 1. Dutch "Please Touch" exhibit. Class watching as screens are rolled back.

Fig. 2. Interior of Vander Vin house in New Amsterdam.

Fig. 3. Children handling objects.

Fig. 4. Junior League volunteer and children at the cupboard bed.

and that they are real. We know, furthermore, that they are similar to the things used by the Dutch.

What are the mechanics of a class visit to the room? All the fourth-year classes scheduled for the day, and the number can range from eighty to 240 children (if the smaller number, it means that the older classes are also visiting that day), are first given an illustrated talk in our large auditorium on life in New Amsterdam. Following this, the lecturer demonstrates the objects that the children will later see and explains their use. This is done for all classes at once simply to save time. Each class is then scheduled for a visit to the "Please Touch" Room at fifteen- to twenty-minute intervals. The Junior League volunteers, each working two hours a week, staff the "Please Touch" Room Tuesdays through Fridays, two or three volunteers working each day. The League felt that this was such an important project that a special committee was formed—the Museum's Committee. As the room is on a floor closed to the general public, the volunteer meets the class on another floor and escorts them to the "Please Touch" Room. With a center aisle dividing two sections of chairs arranged with four seats in each row, the volunteer seats the class, boys on one side, girls on the other. In front of the class is the view of the streets of New Amsterdam, the Vander Vin house most prominent of all. Upon the volunteer's invitation that all may go inside the house, the screens are pushed back to audible "oh's" and "ah's" from the spellbound young audience. The volunteer demonstrates the way the children should go through the room, and as she handles each object recalls that the lecturer had shown it to them downstairs. Then she calls for the first row of four to come up, the children begin their experience, then the next four follow, and so on. It is perfectly true that some merely touch everything, not thinking while they are doing so, but more are far from the world of today and feel themselves actually living in the past, a part of the Vander Vin family. Keeping the class circulating, so that never too many are up at a time, the volunteers steer the children through the exhibit and back to their seats. When all have returned, the children are reminded that this is the only room where the objects can be handled, that the signs in the rest of the Museum that say "please do not touch" mean precisely that.

When you ask the children at the end of the day what they have enjoyed most during their day at the Museum, the answer is always the "Please Touch" Room, and the teachers' comments range from "This is such a wonderful experience for the children and it seems better each year that I come," to "This is worth a whole year's teaching."

Because this whole experience of handling antique objects was such a valuable one for the children, we felt that the older ones should also have the opportunity. For the fifth through eighth grades we offered a lecture on the English period of New York's history. When we tried our Dutch

"Please Touch" Room on them, they scoffed at it as not being real. Therefore we began by showing them individual objects out of context—a candle mold, a pewter tankard, a candle snuffer, a woven coverlet, a man's embroidered vest, a piece of a brocade dress, a newspaper, a fan, an apprentice paper. This was done in the auditorium following the lecture on George Washington's New York. The lecturer demonstrated the objects, placed them on the floor of the stage, and the students lined up row by row to come up and handle the objects. If four classes were being lectured to at one time, it could be a long wait until the last member of the last class had seen them all. The only advantage to this method was that at least the children were seeing the objects. This plan was tried for a year. Then it was decided to take one class at a time (following the lecture) to our smaller auditorium where the seats could be arranged in a circle, with the objects and the demonstrator in the center. As each object was described, it was handed around, except objects that were too bulky or too fragile. As the last object started its round the beginners in the circle could step up and see the coverlet, the china cup, try on (and be laughed at by their classmates) a replica of an eighteenth century cap or a tricornered hat. The advantages and the disadvantages of this system were many. It was not too long a wait for each student to see an object, but he might be looking at a pewter plate when the lecturer was explaining an apprentice paper; any reading material always slowed the flow of the objects, as the child became fascinated in reading the news of 1792.

The members of the Museum's Committee of the New York Junior League, many of whom watched the Museum staff demonstrate the "Please Touch" for the older children, became so interested that the Committee's chairman suggested that we plan and budget a "Colonial Please Touch Exhibit."

With a deadline almost upon us we submitted one and were delighted when it was passed by the Board of Managers of the Junior League of the City of New York. Because the volunteers would be working with older children, we also incorporated in our plan a training course. Even after this preliminary plan had been drawn up, we decided to make a survey of new methods of display used by other museums, for we wanted this exhibit to have genuine appeal to the young and yet be a teaching tool. Therefore we examined as well audiovisual equipment used in the educational field of schools and universities. Limited by space (twenty-four feet at our disposal), we planned to utilize our small auditorium, the opposite end of our "Please Touch" Room and at right angles to it, so that neither would interfere or detract from the other, for only one class would be using the room at a time. We also wanted something that was not completely stationary, an exhibit that, if necessary, could be

moved to another part of the building. So we evolved eight screens, each one illustrating a different topic:

1. Kitchen: A fireplace with cooking equipment, an oven that could be opened, and a peel such as was used by a Colonial family in which to put bread or pies for baking.
2. Lighting: A candle mold, snuffer, and betty lamps.
3. Household: Wooden plate, two-tined fork, homespun cloth, and a sugar-loaf cutter.
4. Education: Slate, quill pen, copies of a horn book, a letter (to show the handwriting), a seal, and a newspaper.
5. Occupation: An apprentice paper, cooper's tool, plane, coverlet, knitted stockings, scissors, and fire tongs.
6. Recreation: Tops, graces, battledoor and shuttlecock, cards and dominoes, a wooden doll, and a doll's four-poster bed.
7. Clothing: A bodice and part of a man's vest, a bag wig and a calash (the latter two were behind glass and could be turned around so that they could be viewed from all sides), a curling iron, and a fan.

The eighth screen, which serves as a cover for screens six and seven, swings out at right angles to show a copy of an eighteenth century mirror, reproductions of portraits to show how the people dressed, and a shelf on which are placed replicas of a tricornered hat and women's bonnets. In this mirror the children can see and laugh at themselves, rather than being laughed at only by their classmates. The total length of all eight screens is twenty-nine feet, but because they are placed at angles, only twenty-two feet in eight inches of wall space is occupied. To be eye-catching and to separate the topics clearly in the child's mind, each screen has been painted a different color, in soft Colonial tints.

How does this work? The exhibit is on the north wall of our room, near the door. The class enters from the east side, is seated in chairs arranged in rows on the south wall, facing the exhibit. The objects are explained to the class, following which half of the class comes up to touch or handle the objects that are displayed. The volunteers hand out to the seated children pictures and reading material: newspapers, which always

Fig. 5. General view of four of the screens of the Colonial "Please Touch" exhibit.

Fig. 6. Detail of one screen of the Colonial "Please Touch" Room.

Fig. 7. Member of an eighth-grade class trying on replica of an eighteenth century bonnet.

Fig. 8. Member of an eighth-grade class examining a cooper's tool, while boy in background handles a shoe last.

Fig. 5

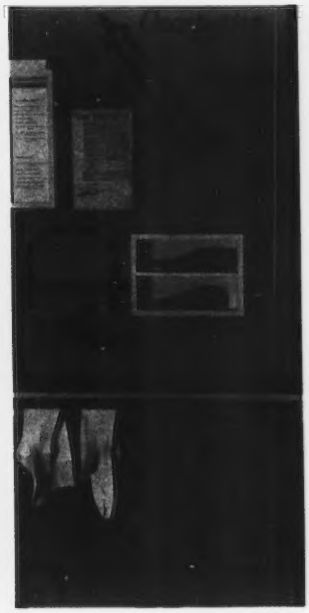

Fig. 6

Fig. 7

Fig. 8

prove extremely popular, photostats of play bills, barber shop, pewterer, cooper, and other trades. These we hope to add to, for they prove extremely popular.

As the volunteers would need more background knowledge in order to answer the children's questions, as well as to give the necessary accompanying talk, a training program was held last fall. A total of six four-hour days were scheduled, three devoted to the Dutch period, three to the Colonial. Meeting the Museum staff and learning the aims, purposes, and physical plan of the Museum, so that the volunteers should feel a part of it, were included in the course. Two lectures on each period were given, one for adults and one for children. Guided gallery tours and reading requirements with oral reports followed, so that all could benefit from the individual research. Then the volunteers watched the staff demonstrate the "Please Touch" rooms, and they, in turn, ran through them before our course members. The Museum's educational staff of three devoted its entire time to the training of these volunteers. Both groups learned a great deal from the experience. As new members of the Junior Leaguers join the Committee, they must in turn meet certain requirements before the children are turned over to them.

It is indeed most gratifying that through the generosity of the Board of Managers of the Junior League of the City of New York, Inc., who contributed funds, these exhibitions were made possible. An Avalon Foundation grant given to the Museum's Educational Department during this period supplemented the League's donation.

From the point of view of the Museum the experience has great value, in that the past becomes alive to the child, for each child has had the experience of handling the antique objects. To the city child, whose grandparents or parents have told him of life on a farm and of the churning of butter, such tales now become understandable, for he has seen and tried a churn. The reasons for the handles on the tops of pots rather than at the side or the long handles on the waffle irons now become plain. Lifting a latch, which is an experience so completely novel to many children and often causes considerable difficulty, is now mastered. Examining an apprentice paper or trying on a tricornered hat or a bonnet make this past more vivid. All the things we of this contemporary age take wholly for granted now take their proper place in history, and the past and the people who lived during those earlier times are better understood. For a group of children, many of whom have no heritage and no treasures of their own family's past, such a link becomes of great importance. The child newly come to New York, from rural Spain, or Hungary, or Italy, or Greece, or Puerto Rico, or our own Deep South, who has seen and used a churn or a candle mold and who, up to this time, may have been ignored by his classmates, now becomes important

because he has actually handled such objects and knows about them.

It is exciting to watch a group of children in our "Please Touch" Room and to study their reactions, for all of the children have them—the intelligently gifted, the slow and backward, the deaf and the dumb, the blind, the emotionally disturbed, the wealthy, and the poor. To all, it seems to speak in its own way.

A Modern Sales Desk in an Old Museum

WILLIAM GERMAIN DOOLEY, HEAD
DIVISION OF EDUCATION
MUSEUM OF FINE ARTS, BOSTON

The problem of installing a modern sales desk in a fifty-year-old building faced the Boston Museum of Fine Arts this year. Almost every other similar institution has, or in time will, come up against the same problem. Museum shops or salesrooms have grown from the post-card and handbook counters of many years ago to active retail sales departments carrying wide varieties of items, directly or indirectly related to the collections of the institution.

At the Boston Museum of Fine Arts this problem was made acute by the almost tripling of its sales-desk activities in the past three years. The policy of the Museum prior to 1957 was to sell nothing that did not represent its own collections. Thus, there were offered post cards, greeting cards, and illustrated calendars, black and white photographs, color-print reproductions and thirty-five-millimeter color slides of paintings, sculpture, and other *objets-d'art* owned by the Museum. There were also Museum handbooks, some departmental catalogues, a variety of illustrated books using Museum objects, and catalogues of special exhibitions held at the Museum. General books on art on display were restricted to those written by members of the staff.

Even despite this restrictive policy, the Boston Museum sales desk had expanded greatly over a thirty-year period. Older members of our staff remember it as a desk (hence the current name for it) with one person in attendance. Recollections are that the original items were handbooks, photographs, and then an assortment of plaster casts. Post cards were added somewhat later. From this simple beginning there was a steady growth until, about 1926, it occupied a full gallery adjacent to the main entrance. There was installed a long, three-sided counter with glass-covered, shallow display space at the top. Behind these counters were the

staff desks, backed up against a bank of files containing photographs of objects in the collection of the Museum. At first this space was more than adequate, but over the next quarter-century it became gradually and seriously crowded with the inclusion of color prints, exhibition catalogues, greeting cards, books by members of the staff, and other material. The photograph files were supposedly available to the interested public at first hand, so the interested public had to climb over the backs of the working staff to get to the files, with mutual dissatisfaction. The theory of keeping everything but post cards and greeting cards under protective glass finally had to give way to an operation that was bursting at the seams. Gradually, and in a haphazard way, books, catalogues, and prints began to appear on top of counters. Primary nearby storage space for immediate replacement of display stock was so limited as to require constant trips to distant basement storerooms. Under ordinary growth, something would have to give, but something more than ordinary caused a crisis that demanded immediate action.

This something more than ordinary was a decision that drastically enlarged the business at the Museum sales desk. It was decided, about three years ago, to place on sale a great variety of objects restricted only to their pertinence to the whole field of art. Thus general art books were stocked, as well as a wide selection of color prints. In addition there were post cards, calendars, greeting cards, pocket books, color slides, casts of sculpture, reproductions of jewelry, and even book matches with designs from early prints on their covers.

This added variety resulted in an even greater growth of sales and made some drastic solution urgent.

Many problems are involved in the enlarging of a sales desk in an old building. Most of these boil down to two needs: more space and its most efficient use.

The Boston Museum of Fine Arts building, erected in 1909, had larger rooms than the old sales desk gallery. None of them, however, had such a good location. Situated right at the major entrance, it was convenient of access to most visitors, so that it was imperative to keep it there and to find room adjacent to it. The adjacent room was a long corridor and, in back, a regular gallery. It was obvious that expansion would have to take place in these directions. To break through the gallery wall was no great problem, but the long corridor was separated by one of the main interior carrying walls of the Museum, of masonry twenty-two inches thick and built to carry the main floor of a monumental building.

In addition to this, some of the nearby galleries above had on exhibit very heavy sculpture. A simple door could have been cut through, but it would have left a badly divided work area. To meet the new sales-desk conception of flexible open space the decision was made to remove the

Fig. 1

Fig. 1. The old sales desk, which grew to this size and clutter from the original sales "desk" of about 1900 at which one person sold handbooks and photographs. This picture was taken in December, 1957, just before a corridor and a gallery wall (rear) were broken through for a new and open sales area. Behind the staff working at the desks are the photograph files, ostensibly open to the public. Additional stock had to be stored in a distant basement room. The shallow glass display compartments on the counter tops were awkward to use, and the gathering clutter obscured the display. The corridor wall (left rear) was one of the main interior carrying walls of the Museum, twenty-two inches thick.

Fig. 2. A dreary corridor, unfit for display, was eliminated when the whole wall at the right was removed, opening up new sales-desk space.

Fig. 3. The wall removed, a temporary support of heavy timbers allows a steel girder and Lally columns to take over the carrying job. The floor above is the main one of a monumental building, and some of the heaviest Egyptian sculpture is nearby on that floor. The entire work area was sealed off, and all the debris was brought out through a direct exit built through a window.

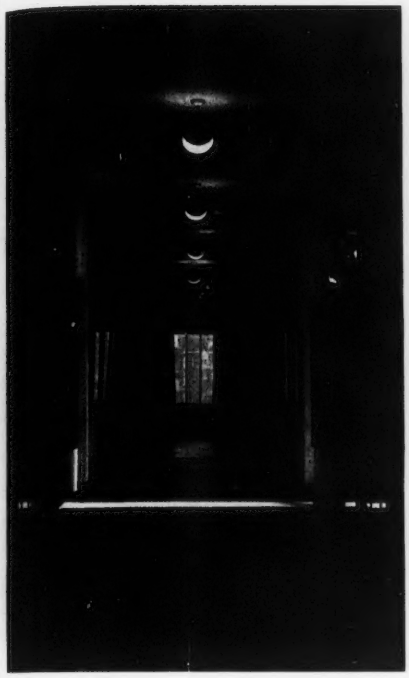

Fig. 2

Fig. 3

whole wall and replace it by Lally columns. This was indeed a ticklish job, and during the reconstruction the whole area had to be sealed and blocked off not only from the public but also from all but a few of the Museum staff. Windows were removed and special exits were built for the removal of rubble without damage to the marble floors. As the wall was taken down, it was gradually and carefully replaced with a network of massive temporary timbers. The final solution, combining adequate support and openness, are four Lally columns ten and three-quarter inches in diameter spaced twelve feet apart. With the removal of this wall and the breaking through into a rear gallery, the Museum now had an open area for a sales desk three times its previous size, and a dreary corridor unfit for display had been eliminated.

Long months before this, considerably more than a year, deep and searching thought had been given to what was wrong with the old sales desk, and, given this golden opportunity, what could be done to design the best sales desk possible. The problem had long been apparent, and

Director Perry T. Rathbone and Carl Zahn, designer for the Museum, had discussed it frequently with the sales desk supervisor, Elizabeth Riegel, and with members of her staff. Logically they were the closest to the problem, and many ideas were worked out. A general policy of flexibility and efficiency was set up as an ideal. The most modern display equipment and the best lighting were studied. The architects of the Museum, Saltonstall and Morton, were called in at a very early date, and the general plan was set up long before the first drill broke the masonry.

Because the prime function of the room was the display and sale of objects, first emphasis was placed here. A system of high visibility and ease of public use was set up. Secondly, space for easily accessible storage was essential. To provide for this, advantage was taken of the specially designed counters, cabinets, cupboards, and drawers by utilizing all the space underneath. The office working area was set up behind counters. The photograph files were set off separately and made more accessible for public as well as staff use. A reading, writing, and smoking lounge was included to welcome the visitor. Specially designed telephone booths were installed. As it stands, now completed, all of these features are flexible. If experience calls for a change in layout, it can be done without very much trouble.

Every piece of furniture and equipment is new, and some of it was specially designed. One wall contains a row of pivoting metal post-card and pocket-book racks of special design. The four-sided racks allow the display of a greatly increased stock. The pivoting is controlled by a device that stops the rack squarely, so that the card or book is always face on to the viewer. The sales-desk staff also designed interchangeable plastic

Fig. 4. The new sales desk, with three times as much space and the stock clearly on view. The prime function of the room is the display and sale of objects pertinent to the fine arts. The Lally columns replace the old corridor wall, and in the rear another gallery wall was taken down to make more space. The center book cabinets are cantilevered to the Lally columns on pipe and structural tee-supports. At the extreme left is a long wall with postcard and pocket-book racks, which pivot to show almost four times more stock. In the rear the photograph files are convenient to both the staff and the public. The pattern of the fluorescent ceiling is made up of two shapes of triangles. Easily accessible storage space is under all the counters and cabinets. The architects sought an effect of general illumination, and the combined daylight, ceiling, and strategically placed spotlights were the answer.

Fig. 5. To welcome the visitor, the institutionalized quality of the entrance has been softened by a reading, writing, and smoking lounge. Built into the counter is a stamp-vending machine, shorn of much of its chrome gadgetry.

Fig. 4

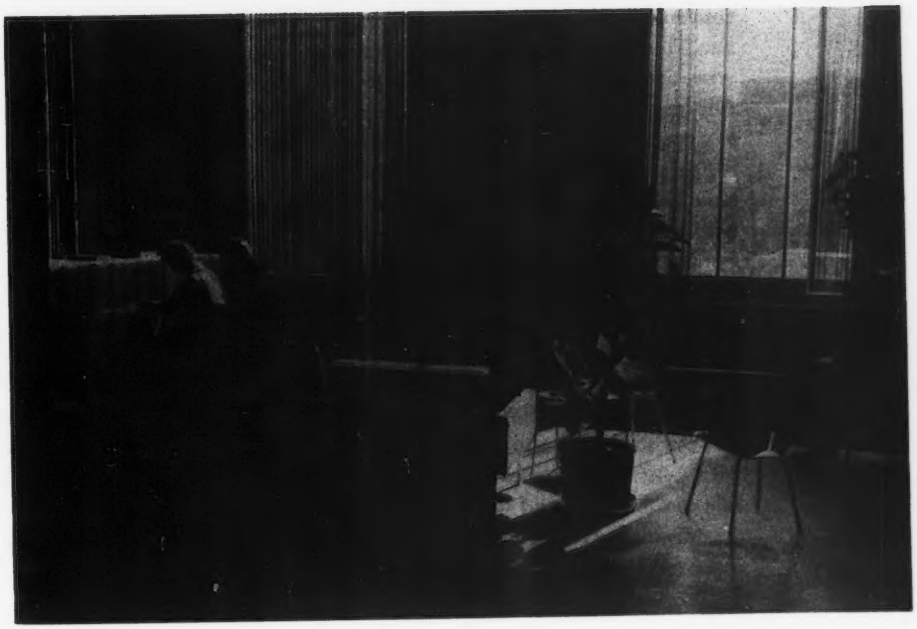

Fig. 5

dividers so that post cards can be displayed either horizontally or vertically. This wall is lighted by concealed overhead fluorescent lamps.

The method of display of color slides is unique, to the best of our knowledge. They are stored overhead in concealed racks. These can be pulled down and viewed before a large lighted panel. Each glass rack holds eighty-eight slides of the two-inch by two-inch size. These racks, with brass frame and pull, form a permanent master display and eliminate the handling of slides by the public. Prospective purchasers can pull down the slide racks, make their selection, and then order directly from the sales desk. The lighted ground glass panel is twenty-four by forty inches to illuminate a full rack of eighty-eight slides. To avoid being tampered with or played with by children, the light viewer switch is concealed below.

On this same display wall is a series of swinging wing-panels for the display of color-print reproductions. These swivel and will show about forty prints from the largest size. Beyond are the only glass-covered and otherwise protected cases, which contain the reproductions of jewelry and the most expensive books.

A great variety of art books and the rest of the stock are shown on open shelves or counters. These book cabinets are cantilevered to the Lally columns on pipe and structural tee-supports. The tops are of rosewood, a material that is also used on all the counter tops.

There are specially designed card racks that can be placed on the top of counters. They have rear legs only, so that the rack tilts forward at a convenient angle. These legs are hinged so that the racks may be stored flat. The bottom of the racks is a series of one-inch slats running lengthwise, and with alternate spaces. Into these spaces plexiglass card holders can be set for cards of different sizes. The racks are designed to fit four to a counter and may be used in a variety of ways.

For peak seasons, such as Christmas, two more full-length counters have been designed. They are brought from storage at such times and with their complements of display racks add greatly to the display space. For this purpose, too, there is an extra cash register and a self-contained wrapping area.

Every opportunity has been taken to find storage space under all these counters and display cases, so that a remarkable amount of stock may be replenished without recourse to the basement storage.

The photograph files are in a location convenient to both the public and the staff, with a master card file and a file of mounted photographs with cross reference to unmounted photographic prints, which are for sale to the public and which are constantly used by the curatorial staffs. A convenience to the latter is a wall-hung telephone. They may make or receive calls without disturbing the working staff of the sales desk.

The public makes selections from the open stock and brings them to the

work counter, which has a parcel wrapping section and cash register. Nearby are a built-in postage vending machine, and a one-inch thick plate glass writing shelf, supported by heavy brass brackets.

The lighting is a combination of daylight from side windows, a ceiling of fluorescent lamps, and strategically placed spots. The effect sought is general illumination, and the main source of this is the ceiling with its sandblasted glass diffusion below the banks of fluorescent lights. The pattern of the ceiling is made up of two shapes of triangles and was designed by the architects to break up what might have been a monotonous surface. The over-all effect is an even, almost shadowless light.

The installation of a modern salesroom in an older building has indeed many problems. In the Boston Museum of Fine Arts the effort has been very much worth while. Visitors now enter and immediately see this bright, airy, and attractive shop and are drawn to it almost impulsively. It is now the busiest spot in the Museum.

Museum Materials on Television

PHILIP C. GIFFORD, SCIENTIFIC ASSISTANT
DEPARTMENT OF ANTHROPOLOGY
THE AMERICAN MUSEUM OF NATURAL HISTORY

Not long after he swung down out of a tree, the first man collected the tree and put it in a museum. A whimsical statement, but it illustrates the undoubted eagerness of museum people to accumulate and preserve, and underscores the primal relationship between the museum and material. Ideally, this material is carefully selected to fill certain gaps in already existing collections, each piece being examined for quality and authenticity. This process of slowly completing a series is constantly going on, increasing the value of the collections for both exhibition and study. Such scholarly inside-the-walls routine is necessary before well-rounded educational exhibits can be designed for the visiting public.

There are, of course, outside-the-walls activities which concern the material resources of the museum. One of these, which is offered as an outlet to museums more and more frequently, is educational television, either in a series of formal programs or as a one-shot show. Whenever opportunities of this sort occur, granting a suitable theme and treatment, the question of cost to the museum is raised, in terms of time, money, and the use of the collections. Considerations will vary according to the type of program and the type of museum. The present article, describing some television experiences of the Department of Anthropology of The American Museum of Natural History, attempts to suggest the complexities of such a relationship and to help estimate the costs.

"Adventuring in the Hand Arts" was produced by the Educational Television wing of NBC and made possible by funds from the Girl Scouts of America (although the Girl Scouts organization was not technically a sponsor and did not control the content of the shows). It was a series of ten half-hour programs shown at weekly intervals over the thirty-three stations of the National Educational Television Network and also avail-

able on film for non-network stations. Although a low-budget effort for national television, the series had the benefit of regular NBC personnel for the camera work, lighting, direction, and set design. A professional "guide," Shari Lewis, who had her own daily NBC show, appeared on all the programs.

Each week a different hand art, such as weaving, pottery, or wood carving, was treated. One set was used throughout, a series of screen-roofed structures referred to as "bazaar areas," which were variously arranged from week to week. Examples of craft work, lent by the Museum, were laid out on tables under the roofs or suspended from the roofs on invisible lines.

As seen on the air, the program ordinarily opened on the guide, who stated the topic and then introduced the guest authority of the week. The two discussed the field in broad terms and then turned to the Museum objects in one of the framed booths. The objects from simple societies were examined for form and use, decoration, and the technique of construction, after which the guide and the authority directed their attention to a nearby table where three Girl Scouts were working on different simple projects related to the theme of the week. (For the leather show, the girls did simple tooling, stamping, and lacing.) These projects were discussed with each girl in turn, demonstrating the techniques and relating them to similar work illustrated by the museum objects. More objects

Fig. 1. Guest John Douksza, of New York University, discusses the importance of craft production with guide, Shari Lewis, and puppet on basketry program.

in the "bazaar" were then presented and clips of documentary films[1] run off in which materials were shown actually being constructed or decorated in simple societies.

To add lightness and humor, a regular feature of each program was a colloquy between the guest and a pun-loving puppet managed by the guide. Following a third session with the Museum objects, the guest disappeared gracefully while the guide announced the following week's program and signed off.

There were variations of this simple format, depending on the amount of film available and the type of project that the Girl Scouts were to do. On the music show, an entire orchestra of girls with home-made instruments performed at the end of the half hour. Some programs, such as the one on pottery and wood carving, had a small selection of the guest's own work shown as a contrast to the museum material.

II

The American Museum's part in the production of these programs began when the material to be used was actually selected. The efficient, business-like approach would seem to have been to require from the studio a copy of the script and a list of ten or so items at least a week before program time. Unfortunately, perhaps, it was a rather less mechanical process for reasons that will become clear later. About forty objects a show were chosen from all parts of the world, illustrating different techniques in the particular hand art and showing degrees of refinement and complexity. One or more objects were specially selected to complement each film segment. These resembled as closely as possible the pieces shown on the film in shape, technique, and provenience. A few larger objects were chosen for their interesting silhouettes. These, beside their visual appeal against a simple background, were usually discussed and attracted a great deal of attention. A few objects of small scale and more personal interest were selected to work with the puppet.

The material for most of the shows was chosen after a conference at the Museum attended by the director of the show, the set designer, the script writer, and the guest for the show, as well as the Museum representative. The show was outlined broadly, and the interests of the guest were explored. After this, the group toured the storerooms, selecting the specimens that most clearly brought out the points to be emphasized in the script, accumulating the required sizes and numbers to dress the set. At the end of the excursion, the designer had sketches and measurements of all the pieces, the writer had a collection of notes on the provenience and native use of the specimens, and the guest had had a preview of the

[1] Not necessarily from The American Museum of Natural History.

material that he would have to deal with on the program. A list of the required specimens was, of course, made out for the Museum.

During the following day or two, these items were brought together and a loan form was filled out, giving the catalogue number of each piece, an identifying description, all pertinent catalogue information, the state of repair, and a valuation for insurance purposes. The specimens were then carefully packed and labeled and delivered to the shipping room in time to be picked up by the studio truck. The script, meanwhile, had been blocked out and submitted to the consultants (one of whom was the Chairman of the Department of Anthropology). Because of the conversational, ad-lib style of the program, it was often as terse as the following extract from the program on jewelry:

SHARI: (Asks about the durability of the eggshell necklace and finds that ostrich eggshell, unlike most eggshell, is very durable).

GUEST: (Shows crab necklace and dead-bird necklace—Montaña Indian. Shows ear pendant of leather and beads from Kenya).

SHARI: (Asks about the source of leather and beads).

GUEST: (Explains source, demonstrates how pendant is worn. Shows glass bead and brass claw necklace from Liberia).

SHARI: (Asks about brass claw motif).

On the morning of the show, the "bazaars" were assembled in an arrangement planned to accommodate the objects, film, and work tables that were to be used. During this process, the crates of specimens were brought into the studio, ready to be unpacked and checked, and the Museum's TV day had begun. To prevent any labor difficulties, it was specified that the Museum was to send a representative to each show who was to supervise the handling of its material and to handle it himself if it was particularly fragile. In practice, it was found easiest to send the person who had helped select and list the material. It was also easier and quicker for him personally to unpack the items and to repack them after the program. The same packing materials were used in shipping the pieces back to the Museum, and each wrapping was carefully preserved. Furthermore, the pre-show stage hands were no longer on duty after the show and the new men had never seen the specimens before.

In the time between the packing operations, the Museum representative remained on hand to advise on the handling and the hanging of materials in the set. For example, occasional problems arose, owing to a layman's lack of ethnological background (which is the top of a cradleboard?); others came from a lack of experience in the handling of museum materials (how is an antique buckskin to be hung safely?)

The material was arranged in the set according to the script in an order that permitted the performers to pass along, relating one object to the next and relating the objects to the Girl Scout activities in a

natural and unharried way. The set was lighted, and the performers arrived and read the script as they walked through the set together. While they discussed the objects with one another and the director, questions as to the use or provenience of particular specimens were occasionally submitted to the museum representative.

Dress rehearsal followed, still very informal, allowing the director to plan camera moves and to establish the time necessary for the various sections of the show. During the rehearsal, the performers traded impressions and fixed the responsibility for making various points about the theme and the materials. The entire program, except the opening and the sign-off by the guide, was carried on in a conversational and spontaneous manner, so that additions to the script and changes in the order of topic were easily made. During the last run-through, the film was shown for the first time, and the performers planned the comments that they might make about it. Other comments could be suggested for use on the program even after this rehearsal, in discussions between the principals or with the Museum representative. Because neither the guide nor the guest were authorities on all the hand processes of the simple societies that were represented, it became the responsibility of the Museum representative to point out whatever was found to be anthropologically misleading. He was also asked to add whatever details he might have to make the pieces more memorable or significant.

A primary concern of the representative was to prevent casual handling of the material. Almost everyone in the studio, from electrician to production staff, was curious about the specimens—particularly musical instruments. Moreover, it is in the nature of television that every specimen must be repeatedly handled in setting up a program of this sort. On this series, each piece was handled a minimum of six times: during unpacking, identifying, grouping in location on the set, hanging in the set, being taken down after the show and moved to the packing area, and, finally, repacking, In addition, some specimens had to be rehung, depending on the camera moves and transitions as they were planned on the floor. Some objects were handled by the performers in the course of the show, and some had to be removed from the set during the show to make room for later action. Professional stage hands, too, are most at home tossing about rubber prop vases and plaster skulls. Their wild way with objects staggers a collection-oriented museum person. Under these circumstances, in addition to the value he may have in interpreting the material, a full-time museum representative is essential for the safety and security of the specimens. Except for hanging, nearly all of the museum specimens were handled by the set designer and the Museum representative. With this care and attention, it was possible to lend more fragile and valuable items to the program without fear of their being injured through carelessness.

III

In this series, 341 specimens were lent for use on the show and five others for publicity photographs in color. They were of the widest possible variety and included many things seen only in museums: a deer's head hunter's cap from Formosa, a North West Coast feast bowl, and a collection of delicate Chinese shadow puppets. The objects that were discussed were identified and placed in a relationship with the culture that produced them. They were contrasted with other pieces from different parts of the world. Each week a well-lighted exhibit was presented, set up in a simple flexible display. The expert technician who appeared with the material was able to treat the particular hand art under discussion from the point of view of craftmanship, combining esthetic and functional values. The NBC staff was uniformly competent and efficient in setting up and managing the production of the show, but a great deal depended on the contributions of the guest and his acquaintance with the museum materials. When he had this background, he could add to the visual stimulation of the objects considerable information about their cultural significance as well as the techniques used to form them.

In addition to these direct educational values, "Adventuring in the Hand Arts" introduced to the viewers a sample of the great wealth of fine material that is to be found in museums. It also offered a clue as to the way in which this material may be critically viewed at the museum. The programs demonstrated that material objects can represent or explain ideas, values, patterns, and processes in human life.

IV

Under the heading of expenses should be included, first, the consultations and script conferences with the Chairman of the department, who also checked the finished scripts. Others in the department were directly involved in putting on this series. The Museum representative was at the studio ten full days (one for each program.) Conferences with television personnel and tours of the storerooms required forty-six or more hours, at a conservative estimate. Listing the almost 350 specimens for fifteen loans and getting them ready for packing, plus checking and returning them to their proper niches, used at least another thirty hours. Further time (at least three days) was spent packing the pieces for shipment, and additional time was needed to get the various shipments to and from the shipping room. Typing and filing the loan lists took perhaps another day. An additional loan of nine pieces was installed at the Girl Scout headquarters in New York in connection with the New York showing of the series.

Obviously, the time totaled here was not called for in standard or convenient-sized packets. Occasionally there was more than one program per

week. Some programs had to be rescheduled. Extra loan material was requested, and the conferences and tours were planned when it was possible for all the television people to get to the Museum at the same time. There were overtime hours both at the Museum and at the studio. These items all meant interruptions of routine museum work.

Both the department and the production personnel of the program worked to discover the most efficient way of preparing the shows. The scripts had to be specially written to take advantage of the particular material available. On the other hand, there were drawbacks to picking material to illustrate a script that had not yet been written. Beyond this, the guest often had suggestions based on his own experiences and point of view. A common tour of the storerooms and a pooling of resources in the Museum attic were found to be the most workable solution.

The visits to the storerooms have proved very stimulating to the television people, who have been trained to think in terms of visual impact and can relate material to the reduced framework of the television screen. However, they were not authorities on the many cultures represented and needed Museum help in selecting material that was typical and pertinent. The Museum had to determine, also, which specimens were too fragile or too valuable to the collections to be lent.

After the first few programs, it was realized that there are certain educational features that a museum can contribute in a unique way. The television people had equipment and plant facilities and could handle the guests easily, but they came to the Museum short of time and with an "education budget." In other words, there was no provision for research. The Museum offered great latitude in the selection of materials, lending freely as it does to any educational institution, and suggested some interpretations. The programs have been well received, and the Girl Scouts are planning to use the filmed series as a teaching aid, showing it to groups within the organization.

V

The experiences of this series reëmphasize requirements that museums should seriously consider when thinking of television:

1. The museum should have material that it is willing to have used. Use starts with selection in the storeroom and continues through the various handlings and packings until the particular item is replaced on the shelf. Material not chosen may be handled in the storeroom and thus "used."

2. The museum should have a fixed loan policy which takes account of the special requirements of television. Loans to glass-case exhibitions in which care is taken by people experienced in handling museum materials are far less wearing, even for a whole year, than are those to a single half-hour television program. (Not encountered on this series was

the problem that occurs when the rehearsals and set dressing come on the day prior to that of the program itself. The material must then be removed and stored, or additional security must be provided.)

3. The museum must have an efficient indexing of stored materials.

4. The personnel of the museum should be thoroughly familiar with the material and sympathetic to the television approach to education. They may be asked to cooperate on a "you get back what you give" basis. The more information and the better specimens, the more possibilities for a successful program.

5. A flexible organization is essential.

6. The museum should have a realistic estimate of the amount of effort that may be called for.

7. The museum must have a concrete notion of its aims and obligations to the public to balance against the expenses. Does it intend to be more than a community institution? Is the value of this type of exhibition with the expense in time, effort, and depreciation of specimens more than a new case installation or a loan to another institution?

8. Curatorial interest must be represented both in the care of the objects and in their interpretation. When the museum lends to other than an established educational group, it should control the use made of the material. This is especially true where a credit or other connection identifies the museum and implies authorization. Otherwise, the loan becomes a straight commercial arrangement and not part of the museum's educational activity.

A Replica of *Diplodocus*

G. E. UNTERMANN, DIRECTOR
UTAH FIELD HOUSE OF NATURAL HISTORY

The present article is the story of how the replica of *Diplodocus carnegiei* Hatcher came to stand on the lawn of the Utah Field House of Natural History in Vernal.

Shortly after the turn of the century, a field party from the Carnegie Museum of Pittsburgh collected a large quantity of dinosaur material on Sheep Creek in the Medicine Bow country of Wyoming. These fossils, which were later to become one of the fine exhibits in the Dinosaur Hall at the Carnegie Museum in the shape of an impressive *Diplodocus* skeleton, created wide interest among the museums of many nations.

In view of this great interest by other institutions, Andrew Carnegie had executed molds of the entire skeleton of *Diplodocus*, from which he ordered ten plaster casts which he then gave to European, South American, and Mexican museums. The first of these, at the request of His Majesty King Edward VII, went to the British Museum (Natural History) on May 12, 1905.

After these initial activities, the molds were stored in the basement of the Carnegie Museum where, for more than forty years, they lay forgotten while acquiring a thick coat of famous Pittsburgh soot, a one-time by-product of the actual mills that had made their creation possible.

Some time after the completion of the Utah Field House of Natural History in the dinosaur country of northeastern Utah in the autumn of 1948, the Carnegie Museum, through the courtesy of Dr. J. LeRoy Kay, Curator of its Section of Vertebrate Paleontology, offered the molds to the Utah State Museum as a gift, if transportation could be provided. The Vernal Lions Club generously paid the freight charges, and, upon the arrival of the molds, the first steps in the resurrection of *Diplodocus* were begun. After some forty years of "dead" and dirty storage, a bath was imperative, and *Diplodocus* was given a thorough one with steam. Broken molds were repaired, and the whole lot was put in order for casting.

Prior to the actual casting, several experimental mixes were tried. A mixture of one part cement and three parts Aggra-lite[1] appeared to be the most suitable for our purpose. Because *Diplodocus,* when stretched out to full length would be seventy-six feet long and our exhibit halls are only fifty feet in length, we decided to place the skeleton out on the lawn. This choice posed the added problem of the hazards of changeable weather and temperatures which in our locality range from 100° Fahrenheit above zero to 40° below. Also we wanted as light a cast as possible. Aggra-lite seemed to be the answer.

We had already made more than a hundred casts of the approximately six hundred needed to complete the job, when Mr. Otto Buehner, president of the Otto Buehner Concrete Products Company of Salt Lake City, paid us a visit and became interested in our project. As the skeleton was to be exposed to severe extremes of weather, Mr. Buehner expressed some doubts about Aggra-lite as the best medium to use and suggested further study. He also kindly offered the experience of his workers and the facilities of his plant, if museum personnel would do the actual casting. We readily accepted the offer and proceeded to truck the molds out to Salt Lake City, where Grant Merrell, our preparator, did the casting of about three-quarters of the material that went to make up the complete skeleton. The other quarter of the casting required glue molds (of the more intricate skeletal parts) and was done at the museum in Vernal.

With the desirability of a lightweight cast constantly in mind, experimentation disclosed that a combination of cement and aragonite (a calcium carbonate) in the proportion of one to three was the most acceptable aggregate. For some of the larger "bones," in order to reduce weight, volcanic cinders were mixed with the aragonite, and the one to three proportion was used for the whole. Wire and steel reënforcing rods were inserted where needed. A cocoa-hued dry color was added to the batch, so that the finished product more nearly resembled fossil bone. Each cast was then covered with fiberglass to protect it from the destructive elements to which it would be exposed in the outdoor world.

In the process of fiberglassing the casts, it was discovered by Mr. Merrell that the fiberglass made an excellent mastic for cementing broken molds and casts together. In fact, it developed that as an adherent it was more effective and resistant than the usual bonding cements that were obtainable. Used with a small portion of the catalyst that comes with the fiberglass itself, it would set in a joint with such toughness that it became the strongest point in any material upon which it was used. (The Buehner people thereafter began using fiberglass cement to repair their Italian marble that had been broken in shipment or in construction, thereby

[1] Trade name for a lightweight product composed of volcanic pumice.

Fig. 1

Fig. 2

saving thousands of dollars.) Here at the Utah State Museum, fiberglass has replaced virtually all other cements as a bonding agent, especially for large or heavy pieces. It is superior in the joining of wood, metal, stone, plaster, bone, or any combination of these, and it cannot be surpassed for use in the preparation of fossils. Fiberglass is sold under several trade names, including "Boat Resin," but a request for "fiberglass" is all that is necessary to secure the desired product. The catalyst, which can be purchased with it, is the secret of its superior qualities as a bonding agent. It is well to mix only a small quantity of fiberglass with the fixative at one time, as it sets rapidly and requires prompt use. The more catalyst that is used and the warmer the room temperature, the quicker the fiberglass sets. Experience will soon teach one how big a batch to make at one time and how strong to make it under given circumstances.

With the return of the "bones" to Vernal, the work of assembling the nearly six hundred cast pieces into anatomical units was begun by museum personnel which consisted of Mrs. Untermann, staff scientist and technician, Mr. Merrell, and the present writer. A limited amount of literature

Fig. 1. Members of the staff of the Utah Field House of Natural History assembling Diplodocus *casts.*

Fig. 2. Diplodocus *laid out in the workshop for a trial fitting.*

Fig. 3. Beginning the outside work. The first "bones" are placed in position.

Fig. 2

Fig. 3

was the only guide available for this "do-it-yourself" dinosaur-assembling project, which has since passed critical examination by experts. Originally, each plaster mold, from which the casts were made, had an identifying number, but with age and use most of the numbers were obliterated and thus were of little help in the assembling process. A working knowledge of vertebrate anatomy and common sense proved far more helpful than reliance upon a vague numbering system.

Each cast piece was drilled and fastened to its adjoining member with a steel rod and bonded with fiberglass. The entire skeleton was assembled and laid out in the workshop so that we could be certain that all bones were present and in the right place. Some smaller and lighter pieces, such as cervicals and the skull, were fastened together in the shop and later assembled in place, outdoors, as a single unit.

With the inside work completed, the crew moved its activities outdoors onto the museum lawn. The cement base was laid, and the supporting steel stanchions and iron framework were set. A chain-link fence, a gift of the Vernal Lions Club, was erected around the work area for protection. Then the actual placing of the skeleton of *Diplodocus* was begun. The heavy pelvis was first placed on its central stanchion. The hind legs and feet were attached next, their proper position was determined, and they were welded into place. The dorsal vertebrae were then welded to the pelvis and to one another. A total of one hundred and three vertebrae, from the head to the tip of tail, were laid in place in their iron cradle. Front legs and feet were fastened in position, followed by the ribs. The

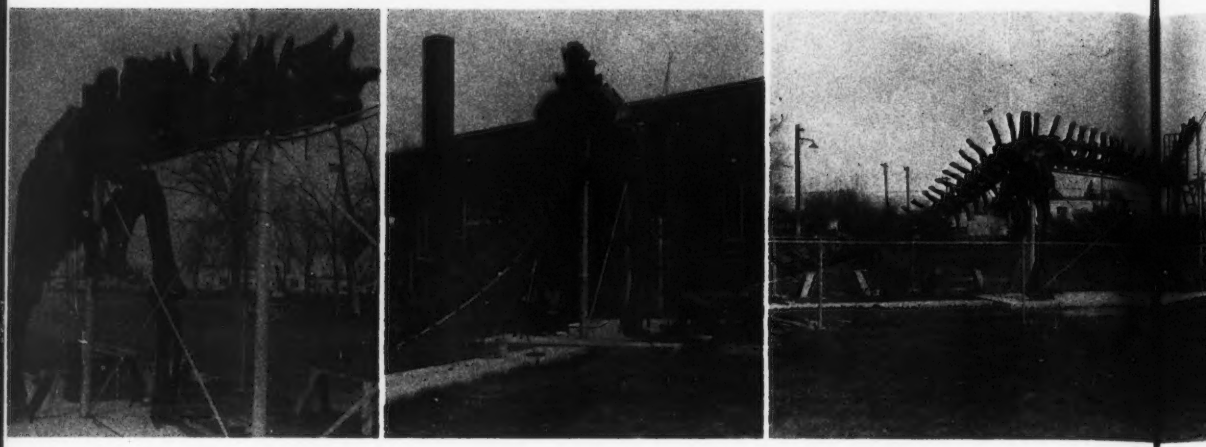

Fig. 4

skull, which rises twenty-one feet above the ground, was the last to be attached. The seventy-six-foot long skeleton was guyed with iron rods which have enabled it to withstand seventy-mile per hour gales that have uprooted trees in the neighborhood. A "Hyster," which is a mechanical lumber loader, was used to lift the heavy casts into place.

Parts of three years were consumed on the dinosaur project, with a total working time of eighteen months. The cost of the completed skeleton was $10,000, most of which was accounted for in salary. The actual material cost only a few hundred dollars.

Because human "erosion" is one of the factors that every museum must deal with, we placed signs at all vantage points which read as follows: "Warning!!! High Voltage. Stay Outside Fence! This Skeleton has been Charged with High Voltage Electricity!" The museum staff is too small to carry the extra load of protection, but this warning has had the proper psychological effect, and *Diplodocus* is still intact.

People ask the funniest questions! Although the label on *Diplodocus* plainly states that the skeleton is an authentic cement replica, some persons ask, "Are those bones real?" We reply that they are made of cement. "Well, where did you dig him up?" At this point you are a little hard put to give a satisfactory answer.

Several museums in the United States and from lands as distant as

Fig. 4. Stages in the assembling of skeleton. Fig. 5. The completed replica.

Japan and Italy have expressed a desire to acquire the molds and cast a *Diplodocus* of their own from either plaster or some of the newer synthetics. To date no museum has apparently been able to make satisfactory arrangements for the acquisition of the molds and the casting of a skeleton. We still have the molds in Vernal, and any museum, anywhere, is welcome to them just for hauling them off. We make only one requirement and that is that after the casting is completed the new owner makes the molds available to other institutions free. We shall be happy to hear from any interested persons. Transportation requires only a large truck, with a bed twenty feet long, a beam of eight to ten feet, and a depth of five feet, to haul all the molds.

The *Diplodocus* on the lawn of the Utah Field House is the eleventh replica to be cast from the molds and, as far as we know, the only one cast in cement for outdoor display as a skeleton.

Does anyone wish to cast the twelfth?

Fig. 5

A Museum for American Folk Art

MARY C. BLACK, CURATOR

ABBY ALDRICH ROCKEFELLER FOLK ART COLLECTION

Nearly twenty-five years ago, most of the pieces in the first major collection of American folk art made by Abby Aldrich Rockefeller were sent to Williamsburg on loan. The paintings and sculptures were displayed in the best location available then—the elegant, restored, Ludwell-Paradise town house on Duke of Gloucester Street. It was the first private house to be purchased for the restoration that was to become Colonial Williamsburg, and its central location attracted visitors to the collection, but certain confusion arose in their minds. Most of the materials in Mrs. Rockefeller's collection were created in the nineteenth century, and here they were displayed on the walls of an eighteenth century house. The citizens of Williamsburg in colonial days were a sophisticated lot, but denying their worldliness was this art of naïve and untutored painters and sculptors. The Ludwell-Paradise house is large, but only a small fraction of the collection could be displayed within its walls.

One person could change all this, and in 1954 Mr. John D. Rockefeller, Jr., asked the architects of Colonial Williamsburg to design a suitable building for the collection away from the boundaries of the restored town. The Ludwell-Paradise house was closed to the public, and the materials in the collection were sent to conservators to be cleaned and restored. The frames on the pictures were tightened and refurbished. All the paintings and sculptures were catalogued, and additional research on pieces in the Abby Aldrich Rockefeller Folk Art Collection was begun.

A large part of the collection's audience are visitors to Colonial Williamsburg. If these changing visitors were the whole of the audience, the task would have been an easy one. But the museum attracts local residents and students of American folk art, and a static permanent display would not serve them as well as changing special exhibitions. Local and visiting school groups, too, profit from the folk artist's intimate and personal view of American social history. When all these factors were taken into con-

sideration, it became apparent that a varied permanent installation was necessary, with adequate space for special exhibitions of a topical or seasonal nature.

A site was found in the unused area that lay between the Craft House and the Auditorium for the first museum designed as a compatible and sympathetic background for American folk art. Experts in museum architecture and lighting were questioned, and two consultants were asked to follow the design and construction through to its completion: Nina Fletcher Little, a leading authority in nineteenth-century folk art and decoration, and Laurence Harrison, an expert in museum lighting. Working with the former director of the collection, Mitchell A. Wilder, and with the architectural department of Colonial Williamsburg under the direction of the resident architect and senior vice president of Colonial Williamsburg, A. Edwin Kendrew, and the director of architecture, Earnest M. Frank, the designers began work.

The problem was to design a building whose exterior would be in harmony with the early nineteenth century design of the Williamsburg Inn next door and whose interior would give the impression of a number of small, country "best" parlors: to provide a large central exhibition space for special shows in which intimate and carefully detailed paintings and sculptures would not appear lost. Eight to ten galleries, office space, sales space, working space, rest areas, and storage space for publications, pictures, and sculptures were required. Complete temperature and humidity controls were necessary for the materials in the collection.

Three years after funds for the building had been given as a generous gift from Mr. John D. Rockefeller, Jr., it neared completion. From an excavation in Virginia red clay, which bore an alarming resemblance to the Inn pool next door, rose a graceful and simple two-story brick building facing off the street onto a garden designed by Alden Hopkins, the landscape architect of Colonial Williamsburg.

The finished building is a beauty that fulfills the best expectations of all the people whose imagination, ingenuity, and skill went into the design. The galleries complement the paintings and sculptures in a satisfying way, and the vistas from each room give a pleasing flow and change of pace from gallery to gallery.

The colors and paneling in Gallery 1 were selected as suitable backgrounds for eighteenth century portraits and landscapes. An eighteenth century over-mantel was installed above the corner fireplace. In other galleries nineteenth century decorative elements were employed. In two instances inspiration came from portraits in the collection. The terrazzo floor in the foyer in black, gray, and white diamonds, separated by the narrowest of brass strips, simulates the marbleized floor painted in a cube design shown in a portrait titled "Child with Dog" by an unknown artist.

In an upstairs gallery the floor is copied from one that appears in the Goya-like portrait of "Boy with Finch" recently attributed to John Brewster.

As the materials in the collection emphasize the esthetic and decorative aspects of folk art rather than utilitarian pieces, no attempt was made to furnish the rooms, with the exception of country benches in natural wood finish that were provided for visitors' comfort.

The main gallery, the first room that visitors enter, is large compared with the rest of the small, intimate, low-ceilinged galleries designed as country rooms. Its walls are a soft gray-blue with white woodwork with simple details. Special exhibitions are highlighted, and gallery talks begin here. The permanent installation for this room is a collection of weathervanes, which has increased in size in the last two years. The wall color is a quiet foil for the vanes, and the whole effect is light and airy.

The lighting of the main gallery is flexible and may be changed to suit particular exhibitions. General lighting here as in all the museum's ten rooms comes from a cove lowered from the ceiling which runs around the gallery walls. The ceiling itself is lighted from the opposite side of the cove, and these lights may be raised or lowered at will. Spotlights concealed by covers are available for lighting individual pieces. These spots provide a flexible and versatile source of light: they may be used to highlight standing pieces of sculpture, and for two Christmases they have been trained on a large tree decorated in folk tradition. The floor of the central gallery is laid with brick tile in a diamond pattern waxed and buffed to a soft glowing finish. White party benches copied from those in a New England ballroom are fitted close to the wall in this room. Their appearance is architectural, but they can be removed for special exhibitions.

A cantilevered stairway runs to the second floor and down to the small basement gallery. Visitors are led up to the second floor by a Liberty vane that points in that direction, and small incisive watercolors hung on the stair wall lead the visitor down. At the present time the small downstairs gallery is useful only for the display of large carousel and cigar-store figures. But to add interest to the room a long, lighted display case

continued on page 376

Fig. 1. Designed to blend with the architecture of the Williamsburg Inn next door, the collection's new building faces off the street onto a garden planted with box, ivy, bulbs, and flowering shrubs. Several pieces of sculpture from the collection have been placed in the garden.

Fig. 2. Main Gallery, showing sculptures, paintings, and the party benches that were copied from those found in a New England ballroom.

Fig. 1

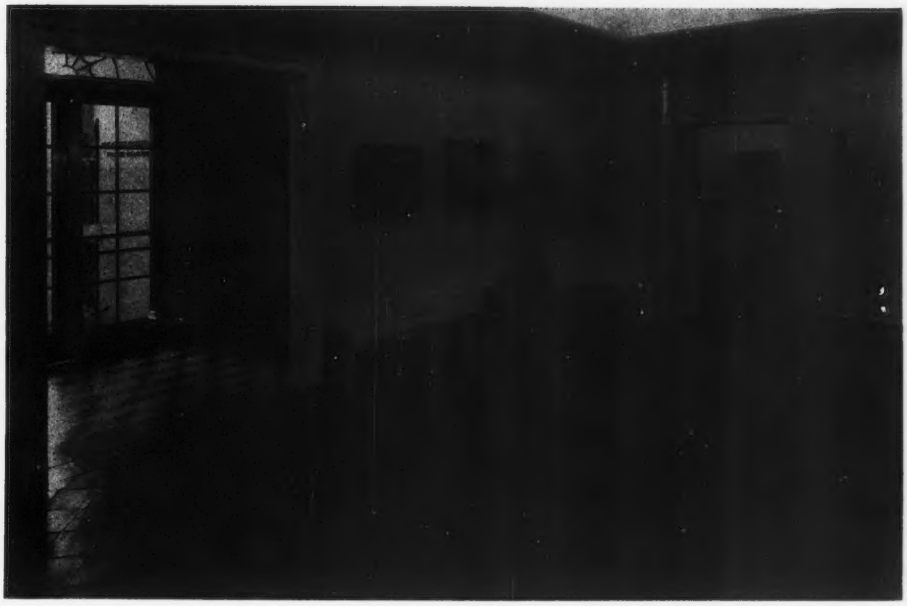

Fig. 2

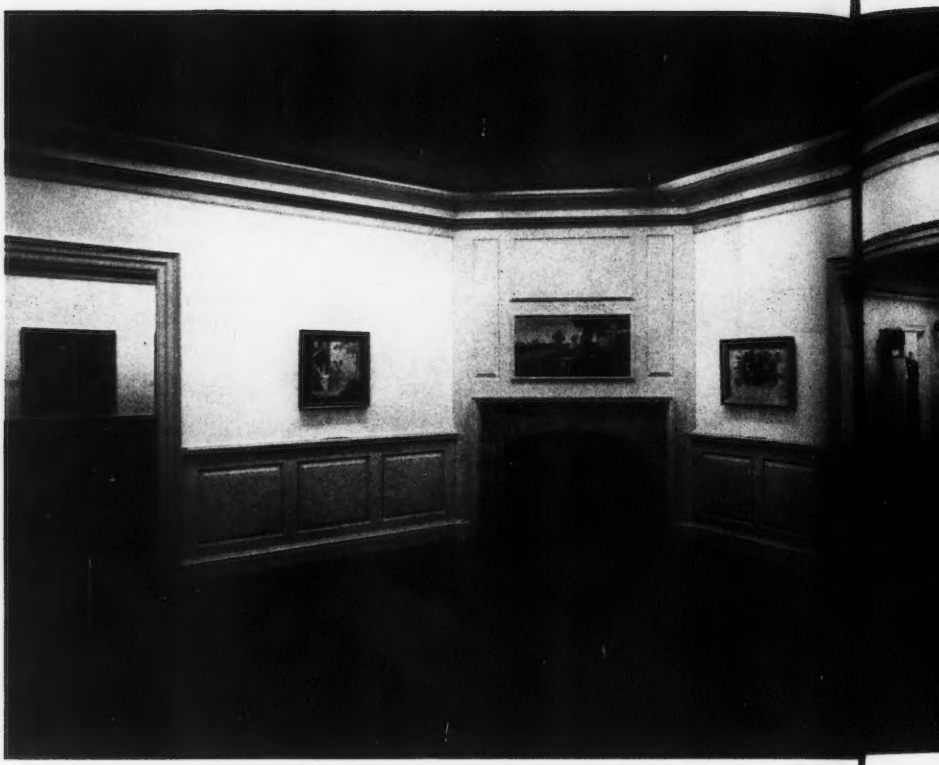

Fig. 3

Fig. 3. The moldings and mantels in Gallery 1 were designed as a compatible background for the eighteenth century pieces in the collection. The over-mantel, "Landscape with Figures," is a permanent installation.

Fig. 4. Carolina Room. The fireplace wall from the room painted in Wagram, Scotland County, North Carolina, shows the "Vue of New York" over-mantel painting and the original mantel located in North Carolina after the room had been purchased for the collection.

Fig. 5. Gallery 2 of the Abby Aldrich Rockefeller Folk Art Collection, showing painted woodwork, mantel, and lighting cove and a view of the weathervane installation in the main gallery.

Fig. 6. Detail of floor, Gallery 9. The painted, stenciled floor in this gallery has been copied from the one shown in "Boy with Finch" on exhibit in the same room.

Fig. 4

Fig. 5

Fig. 6

(framed in walnut and with a simulated plaster back wall) will be installed in the near future. It will be used for a number of the small, brightly colored fracturs that appear lost and adrift in the other galleries.

Behind locked double doors are the storage and working areas of the collection. There are open shelves for storing sculptures, and twenty-two large, steel-framed, wire-mesh racks on rollers for hanging pictures. While the museum is a small one, the reserve area for storage makes materials not on exhibition immediately available for reference or for changing exhibits. In the work room is an office newly created for the secretary-cataloguer of the collection.

The building is a shell within a shell, and only the front windows look to the outdoors. The rest of the windows, interior and exterior, are false, an artificiality that was used for good reason. To permit the pieces in the collection to be seen as though in eternal daylight, the interior lighted windows have proved to be an effective solution. The upper sash in each case is nearly opaque, the lower translucent. Modern glass simulating old glass has been used in all but the real windows at the front of the building. In each gallery an arrangement of incandescent and flourescent lamps gives the effect of sunlight behind the windows. They are backed approximately six inches from the sash by sheets of masonite painted a light gray-green.

No provision was made for lighting the exterior windows, and until recently the side of the building that faced the street was blank and eyeless. Neither Mr. Harrison nor Mrs. Little is satisfied, however, with less than perfection. Fortunately, the false windows are positioned the same inside and out, and after a number of discouraging experiments a solution to the problem has been found. Two sheets of plexiglas separated by half-inch shims have been substituted for the masonite backing behind the interior windows. The window lights now light the building both inside and out. From the exterior, the lamps are invisible in the daytime, but at night the windows shed a soft glow. The gallery is open from 12:00 noon until 9:00 P.M. every day except Monday, and evening visitors to the gallery are led in by the lighted windows. The deserted appearance from the street has disappeared!

The only piece shown in the stairwell leading to the upper galleries is a large figurehead of Minnehaha from the clipper ship of the same name. It is cantilevered from the outside wall of the building and is a permanent exhibition. Lighted by a ceiling fixture and by a masked spot, the figurehead throws a dramatic shadow on the back wall.

Mrs. Little located a paneled room that had been removed from a house in Scotland County, North Carolina, which was purchased for use in the central gallery on the second floor. The painted room was executed by an itinerant artist, I. Scott, in 1836, and is in itself a fine example of folk art.

The pine walls, wainscoting, and doors were painted to simulate other woods. A cornice of painted garlands and flowers caught by cords encircles the room, and a "Vue of New York" (an imaginary scene depicting the fire of 1835) provides the over-mantel decoration. While Mrs. Little was in North Carolina doing research on the room she found the room's mantel in the home of one of the original owner's descendants. Turned to the wall, it had been used as a shelf for storing jars of jam and jelly! Mrs. Little bought it on the spot, and it was sent to Williamsburg in doubtful splendor resting on the floor of a flat-bed truck!

In all but this gallery, materials are placed at eye level along the walls. This is done not only to make viewing easy but to give an intimate air to the low-ceilinged rooms. In nineteenth century farmhouses and small town houses, paintings were hung high (the evidence is found in a number of interior genre scenes painted by folk artists), and in the Carolina Room, to show the pieces as they were originally seen, portraits and Biblical scenes have been positioned high on the walls.

There is low wainscoting in several of the galleries, and one gallery has a stenciled cornice inspired by a design from the Governor Pierce Mansion in Hillsborough, New Hampshire. The colors used throughout the building have been taken from rooms shown in paintings or from colors found in New England and Pennsylvania farmhouses. Three recessed lighted cases in the upper hall are used for small sculptures, and a collection of decoys is hung on stepped racks that the visitor may imagine as decoys floating in water.

With the exception of the Carolina Room, all the gallery walls have been plastered with vermiculite plaster. Wall hangers pull out clean, leaving only small nail holes that are easily patched and painted. Because of this special plaster, exhibitions may be changed with a minimum of effort, and special hanging cornices or devices are unnecessary.

The sales room, recently redesigned to permit an effective display of a growing list of publications and reproductions, is placed to the right of the main entrance.

In the beginning it was thought that the collection would remain constant, but as new and exciting discoveries of American folk art became available a number of important acquisitions have been possible. Through the generosity of the Museum of Modern Art, Mr. John D. Rockefeller, Jr., and his sons, all the materials originally in Mrs. Rockefeller's collection have been returned to it, and a number of new pieces have been purchased.

The immediate and first impression of the collection, which is serving visitors to Williamsburg, local residents, and art and social historians, is one of pleasure and content, of order and space, and of a project perfectly and beautifully completed.

CURATOR BOOK REVIEWS

The Designer in the Museum. *Ann Ferebee. Industrial Design, vol. 6, no. 5, May, 1959.*

The Picture Wall. *Michael Brawne. The Architectural Review, vol. 125, no. 748, May, 1959.*

"The Picture Wall" is primarily concerned with the international art museum and the specific use of space and, above all, light by many newly constructed museums. The new museums seem to illustrate the contemporary architect's striving for the "unhampered display of architectural virtuosity" as well as experimentation "with the new notions which have been developed about art viewing."

Michael Brawne in his opening sentence states, "art in the mass for the masses is an artificial creation demanding the most deliberate handling; essentially it is a piece of exhibition technique." This bit of presumptuous snobbery is a most common attitude among "progressive" art museum people. The idea itself, "art in the mass for the masses," is noble, but to assume that the illustrations of new museums included in the article actually fulfill this philosophy is to be somewhat facetious. *The Architectural Review* article is, however, quite interesting in that it shows some very exciting structural forms that should delight the sophisticated museum-goer who will be able to judge an individual painting and its details in a relatively uncluttered and esthetically pleasing environment.

But what of the "masses" with little or no background in the field of art history? Is it not the obligation of a museum to instruct, if we are to interpret the word "museum" according to the social requirements of the day? It is about time that art museum directors and their staffs reëvaluate the role of the art museum as storehouses of historical specimens

aimed at a relatively specialized audience. What of the pioneer work done by Valentiner and Dorner who long ago envisioned "living museums"? Valentiner at least accomplished at the Detroit Institute of Arts a microcosm of the world of art, representing in clear historical sequence, gallery by gallery, every period of art history from prehistoric times to the present. Each gallery was to be a representation of a period of culture shown as a cultural unity. In this way an uninitiated visitor had a trip through time and could better understand the cultural forces that produced the art he was viewing. The initiated visitor could still view his favorite masterpiece for its own intrinsic value.

Mr. Brawne's article points out that the basic concept of the art museum has changed little since the days of the curio cabinet, only that the curio cabinet is now more spacious and uncluttered and better lighted.

It is by sheer coincidence that two major design magazines in the month of May analyzed the "museum" from the point of design.

Ann Ferebee's "The Designer in the Museum" presents major design departures in three science museums, which should be required reading for every museum director and his staff. The new philosophy of presenting complex information to the non-specialist points out the value of the designer as a major contributor in the field of public instruction. "Shaking off the dust of decades, the museum looks toward a dynamic future as combination research, social and education center. For the designer this can mean an opportunity to experiment with new approaches to exhibition."

Besides creating an environment that leads the visitor through a visual and educational experience, the designer must also be a taste maker. It is his duty to free us from the fixations of tradition and symbolism usually associated with color and form by emphasizing the direct sensuous perceptional impact of color and form upon the spectator. In exhibition design, in which the transmission of concepts and facts is the immediate and explicit purpose, ideas can be communicated by visual symbols, symbols common to the average layman's own experience, which act as substitutes for words and increase their effectiveness as meaning carriers.

Miss Ferebee also states that "the non-art museums have pioneered in the explanatory exhibit, and here, barring official opposition—which may be considerable—the way is open for the designer to experiment with three-dimensional communication through the objects in the museum collection."

A report on how three very different museums are now solving museum design problems is included, and four theoretical and thus far untested solutions to some museum design problems are also presented.

L. P. W.

The Problem of the Picts. *Edited by F. T. Wainwright. New York, Philosophical Library, xii+188 pp., 12 pls., 16 text figs., 6 maps, and end papers, 1956, $6.00.*

On the east coast of Scotland, from the Firth of Forth to Moray Firth, is the land of the Picts. From about 330 to 850 A.D. they had a historical existence, were recognized by their neighbors as a distinct people, spoke a dialect of Celtic, were governed by their own chieftains or kings, and followed a way of life that contained elements strange and foreign to other Celtic-speaking people.

In spite of the references to them by classical authors, as well as by such ecclesiastical ones as Bede, they have long remained a fascinating mystery that is still not fully cleared up. Who precisely are they? Where did they come from? How are they related, if at all, to their Gaelic neighbors to the west and their British ones to the south? There have even been doubts that they ever existed as a separate people.

As long as documented evidence was scanty, the imagination of historical writers had a field day. It is the great merit of Professor Wainwright that he has assembled in this absorbing and painstaking series of essays by specialists in various fields an authoritative corpus of facts and of legitimate inferences from them that archeology, art, history, and linguistic analysis can bring to bear on the reconstruction of these people.

From these studies one sees with tremendous respect how modern scholarship is able to extract information from apparently unpromising material and with what care each deduction is established. From all these studies the Picts emerge as a composite. Upon a substratum of non-Indo-European speakers, with a culture having affinities with ancient circumpolar groups, was spread a layer of P-Celts related to the more southerly Britons. Whether this group of Celts were overland invaders or an offshoot of an earlier source on the continent is not clear. That they were not so-called Goedelic or Q-Celts from Ireland is definitely ruled out by the marshalled facts.

The date of the Celtic invasion is not altogether clear, but out of these elements was fused the local variant of the Celtic world known as Picts. The various contributors to this excellent volume, all scholars seated in Scotland, are to be congratulated on an extremely sound, careful appraisal of a particularly difficult problem.

H. L. S.

The Social History of Lighting. *William T. O'Dea. London, Routledge and Kegan Paul, 1958, 254 pp., 91 illustrations, 42 shillings.*

It is extraordinary how little has been written about the history of lighting, from either the point of view of the lighting specialist, or that of the "ultimate consumer." Indeed, research on the subect in the last hundred years invariably leads to manufacturers' catalogues as the most reliable sources of information.

This excellent book by a keeper of the South Kensington Science Museum, who is in charge of the lighting collections, is therefore especially welcome. Mr. O'Dea has written a book both fascinating for the general reader, and full of essential information for the serious student. Furthermore, it is written with wit and urbanity.

By emphasizing the sociological aspect of the history of lighting, the author has been able to relate scientific and technical development to everyday life in a thousand-and-one interesting and informative ways. Throughout the book, the reader's attention is constantly drawn to the inseparability of contemporary living with contemporary lighting, and the hand-in-hand development of modern industrial society with the revolutionary advances in illumination that started with the invention of the Argand burner in 1782. The range of the subject matter is well disclosed by a few of the chapter headings: "Light for the Home," "Light for Work," "Light for Travel," "Light for Worship," "Light for the Theatre." There is a short section on the history of lighting in museums and art galleries which

many will wish had been longer. However, as the author points out, such lighting is a recent development, almost totally confined to the age of electricity.

Mr. O'Dea's thoroughness led him to recreate some of the earlier forms of lighting to the original materials specifications, notably primitive candles, about whose luminous properties there is some doubt. His numerous quotations from contemporary sources are always apt and revealing, and often amusing. However, while many of the thirty-two plates are well chosen, some are not reproduced large enough for detailed inspection. Also, because a book of this nature demands copious and accurate illustration, it is a pity there are not more of such plates and fewer of the author's own sketchy text figures, which fall lamentably short of the standard set by the writing.

Such criticisms are minor, however, when viewed against the author's whole achievement. There was a vacuum for this book to fill, and it has been filled outstandingly well. We are not likely to see a more authoritative work on the subject for many years.

G. R. R.

A Guide to the Practice of Public Relations. *Prepared by the Institute of Public Relations. London, Newman Neame, Ltd., 1958, 243 pp., illustrations, 30 shillings.*

Here is a book that combines sound advice on the practice of public relations and interesting sidelights on the harnessing of the various instruments of communication in Great Britain. Prepared in the form of a symposium and intended primarily for newcomers to the profession in the United Kingdom, the volume will be welcomed by all who are concerned with good public relations, with public affairs, and with the public interest.

In this comprehensive work, which is the first survey of its kind to be published in Great Britain, useful aids and new insights are presented not only for public relations specialists, but also for exhibit preparators, graphic artists, and personnel responsible for the purchase of printed matter. In addition, administrators concerned with the internal and external "images" of an institution will find in these pages many guides to the establishment of a sound and effective public relations program.

The Institute of Public Relations, sponsor of the book, is the only organization in the United Kingdom devoted to the study and development of public relations. The organization was founded in 1948 by a group of public relations officers from commerce, industry, and central and local government, and has experienced a rapid growth. Its membership now numbers over a thousand. (The counterpart of this organization in the United States is the Public Relations Society of America.)

A panel of three, all leaders in the field, edited the publication, and twenty-four leading members of the Institute have contributed chapters. The editors are to be congratulated on the soundness of the book's organization. The authors deserve bouquets for both the clarity and the readability of their contributions. And the publishers deserve a commendation for the format of the book, the typography of which embodies the best principles of effective communication.

The Institute's definition of public relations is "the deliberate, planned and sustained effort to establish and maintain mutual understanding between an organization and its public." In this frame of reference the writers of the first two

sections of the book take up in detail, but do not belabor, the purposes and functions of public relations, the types of problems that may be encountered in practice, the constituents of "the public," and public opinion research. In the third section other authors describe the media available in Great Britain and the principles governing their use, and outline the specifics of operation. Discussions are included on the fundamentals of good press relations; the conduct of press conferences; the uses of press, radio, and television; photography, films, and other visual aids; the printing processes and their application; exhibition planning, design, and cost; advertising; house journals; and the spoken word. The concluding section is devoted to the organization of public relations practices in business and government.

Obviously some of the content will not have application outside the United Kingdom. However, many aspects of the material cast new light on problems that apparently are universal.

R. N.

7000 Years of Pottery and Porcelain. *Max Wykes-Joyce. New York, Philosophical Library, 1958, 276 pp., 86 illus., $12.00.*

If we were limited to a single class of objects by which to reconstruct the past or to assess the esthetic history of a people, it would be difficult to name a more useful one than ceramics. One is tempted to say that virtually all the post-Paleolithic archeological reconstruction of the past would collapse without the aid that this almost indestructible artifact has provided the scholar. Chronologies have been established on the basis of variations in form and decoration of pottery. Trade, contact, diffusion, and other cultural dynamics are more frequently than not determined by a comparative study of potsherds. From the decoration, glazes, and slips, not only technological information but much insight into esthetic development can be derived.

Aside from these matters of scholarship, ceramics provide for many connoisseurs a source of delight and beauty that rivals any other form of art. Because potters of every culture tend to evolve characteristic styles that enrich themselves from the influences received from other cultures, the lover of the art has a great treasury from which to please his fancy.

Although books on pottery or ceramics are far from rare, mostly they concern themselves with one period, one country, or one style. For a subject as complex as this such specialization is not unexpected and fills a very real need. There is also, however, a need for the sweeping survey, the world view of pottery. Such books, at least good ones, are infrequently encountered. Max Wykes-Joyce's "7000 Years of Pottery and Porcelain" is such a one. The 7000 years in the title is fairly literal, although Wykes-Joyce does not linger on the earlier stages of pottery. Once he reaches the discovery of glazes and porcelain he seems to be in the domains he finds most congenial. The reader should, too, for Wykes-Joyce is an excellent guide and highly selective, as he must be for so wide a purview. Sufficient historical, social, and anecdotal material is included to provide a delightful human background to the history and development of the art of the potter. Unfortunately the publishers have not furnished so good a set of illustrations as the book deserves and the price warrants. Despite this, the text is a splendid introduction to a subject of unending charm.

H. L. S.

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